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ENSILIN TESTS ON SELECTED CLAYS AND SHALES

APPROVED:

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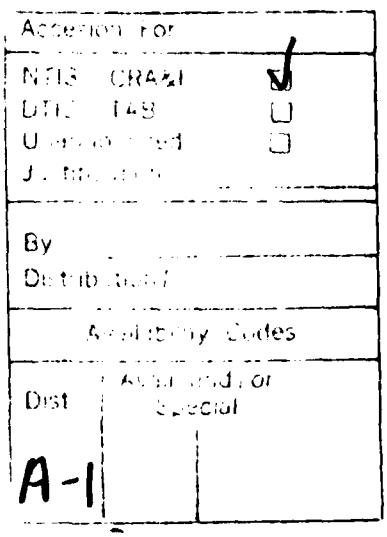
ABSTRACT

This thesis investigates the results from a fluid adsorption test, Ensilin test, to determine the predictability of the swelling tendencies of shales. The experiments were performed on four standard clays and five field shales in different concentrations of potassium chloride solutions. The results of the experiments were correlated with previously published shale classification schemes and other experiments performed on the same shale samples. This thesis shows that the Ensilin test does help to predict the swelling tendencies of shale samples and can be used to help classify various shales.



To my wife, Debra, who has been my

inspiration and support these past two years.

ENSILIN TESTS ON SELECTED CLAYS AND SHALES

by

THOMAS CARLYLE REDFORD, B.S.E.

THESIS

Presented to the Faculty of the Graduate School of

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CHAPTER ONE
INTRODUCTION

Problem shale formations can be found throughout the world and are one of the most difficult formations to drill effectively. Shales are sedimentary rocks deposited in a marine environment that contain silt and clay sized particles.[23] Clay minerals that are found in shales cause instability in many formations. The clay minerals ranked in order of instability from greatest to lowest are: smectite (montmorillonite), mixed layer (montmorillonite and illite), illite, chlorite and kaolinite.[16]

When these clay minerals are exposed to water in drilling fluids, they swell, disperse and eventually cause wellbore instabilities. This leads to many problems in drilling and completing wells including: hole enlargement, washouts, tight holes, stuck drill pipe, solids build-up in the drilling fluid, poor primary cement jobs, and in some cases abandonment of the well.

If these problems can be minimized or avoided through a proper mud system, then the benefits include shorter drilling time, stable and gauge boreholes, and decreased drilling and completion costs.[17] However, before a mud system to treat the problems can be developed, the shales must be properly classified. This study looks at previous shale classification schemes and investigates the relationship between the Ensilin tests performed and these classification schemes.

CHAPTER TWO
LITERATURE REVIEW

This chapter gives a brief review of the numerous works on shale classification and shale control.

2.1 Clays

In order to understand shale instability, one must first look at the individual clay minerals that compose a shale. Clay minerals consist of stacked layers of an alumina octahedral with silica tetrahedrals on both sides. The silicate surfaces of the clay layer have a negative charge due to substitution of cations in the octahedral and tetrahedral layers.[3,26]

In montmorillonite, magnesium, Mg^{2+}, is substituted for aluminum, Al^{3+}, in the octahedral, causing the clay mineral to be negatively charged at the surface. An extra positive ion, usually sodium or calcium, is adsorbed to balance this negative charge. Conversely, in illite, aluminum, Al^{3+}, is substituted for silicon, Si^{4+}, in the tetrahedral layer causing strong negative charges at the surface of the clay mineral. These negative charges are balanced by potassium ions that hold the clay layers together.

With potassium ions holding the adjoining clay layers together, it is difficult for water to move in and cause expansion. However, when sodium or calcium cations are used to balance the negative charges, the clay layers are not held tightly together, and water can interact with the clay mineral and cause swelling.[22]

2.2 Swelling

The two general swelling mechanisms suggested by clay mineralogists are surface hydration and osmotic swelling.[6] Surface hydration involves the adsorption of up to four molecular layers of water. In the surface hydration of shales, the hydration energy is quite high, but little softening or visible swelling is present.

Osmotic swelling occurs when the ion concentration is higher at the clay surface than in the drilling mud. The amount of swelling depends on the salt concentration in the clay relative to that in the fluid. This type of swelling causes large volume increases and softens the clay. In sodium montmorillonite, swelling causes the clay layers to separate allowing osmosis between the layers as well as on the surface.

2.3 Shale Classification

Once the swelling mechanism of clays is understood, the next step in shale-control is classifying the problem shales. Shales have been classified by many different parameters ranging from visual inspection to complicated experimental analysis. In 1968, Kelly classified shales according to their characteristics and clay content.[11] His classification scheme and drilling fluid recommendations is shown in Table 1 on page 4. This shale classification scheme is limited since it was based only on the texture and clay content of the shales.

In 1969, Mondshine used the methylene blue capacity, from experimental analysis, as the primary measurement for his classification scheme.[15] Texture, moisture level and clay content were also used. However, since water from the drilling fluid alters the water content of the

shale cuttings, the methylene blue capacity is more reliable. This classification scheme is shown below in Table 2.

Class	Characteristics	Recommended Drilling Fluid
A	Soft, pliable, with few fractures. Composed of moderate to large amounts of calcium or sodium montmorillonite.	Oil-phase mud.
B	Hard, fracture , containing large amounts of calcium montmorillonite.	Freshwater-mud.
C	Hard brittle, lightly fractured. Composed primarily of sodium montmorillonite.	Inhibited water base mud.
D	Hard, fracture . Contains primarily kaolin, illite, chlorite, or a mixture.	Freshwater mud.

Table 1. Classification of Problem Shales by Kelly[11]

Class	Texture	Methylene Blue Capacity	Water Content	Wt % Water	Clay Content	Wt % Clay	Density g/cc
A	Soft	20-40	Free and	25-70	Montmorillonite	20-30	1.2-1.5
B	Firm	10-20	Bound	15-25	Illite and Mixed layer	20-30	1.5-2.2
C	Hard	3-10	Bound	5-15	Trace of Montmorillonite High in Illite	20-30	2.2-2.5
D	Brittle	0-3	Bound	2-5	Illite, Kaolin Chlorite	5-30	2.5-2.7
E	Firm-hard	10-20	Bound	2-10	Illite and Mixed layer	20-30	2.3-2.7

Table 2. Classification of Problem Shales by Mondshine[15]

O'Brien and Chenevert, in 1973, developed another shale classification scheme based on the total and individual clay content, strength,

and the hydration and dispersive properties of shales.[17] Their classification scheme is shown below in Table 3.

Steiger realized that some shales that fall into one class of drilling characteristics do not necessarily fall into the same class of clay content from O'Brien and Chenevert's classification scheme. In 1982, Steiger expanded upon the system by using one number for drilling characteristics and a second number for clay content.[22] For example, a class 1,2 clay would have drilling characteristics of class 1, (soft, high dispersion), and clay content of class 2, (fairly high in montmorillonite, high in illite).

In addition to that combination of numbering, he ranked the shales by their specific surface area determined by the 2-ethoxyethonal method. His modified classification scheme, with the surface area ranges from experimental data, is shown in Table 4 on page 7.

Class	Characteristics	Clay Content
1	Soft, high dispersion	High in Montmorillonite, Some Illite.
2	Soft, fairly high dispersion	Fairly high in Montmorillonite, High in Illite.
3	Medium-hard, moderate dispersion sloughing tendencies	High in Interlayered clays, High in Illite, Chlorite.
4	Hard, little dispersion sloughing tendencies	Moderate Illite, moderate Chlorite
5	Very-hard, brittle, no significant dispersion, caving tendencies	High in Illite, moderate Chlorite.

Table 3. Classification of Problem Shales by O'Brien and Chenevert[17]

In 1983, Wilcox and Fisk used the swelling and dispersive properties of shales from the fluid adsorption and capillary suction time experiments.[29]

2.4 Drilling Fluids

Once the problem shales have been identified, an appropriate drilling fluid program must be used to properly drill the hole. In 1969, Mondshine developed a new technique to estimate the salinity requirements for an oil mud to properly balance the water adsorption forces in the shale.[15]

Chenevert introduced the balanced-activity oil continuous mud in 1970. This drilling fluid concept was to prevent the transfer of water to a shale by increasing the salinity in the water phase until the chemical potential was equal to or greater than that of the formation.[4]

Due to the increased costs and many environmental regulations relating to oil-based muds, water-based drilling fluids were developed to control the shale problems of the industry. O'Brien and Chenevert developed a potassium based drilling fluid to control shale instability.[17] Table 5, on page 7, shows their recommendations on the adequacy of potassium/chloride solutions for certain shale classes. Note that the shale type is the same as in Table 3.

In 1982, Steiger suggested a potassium/polymer mixed drilling fluid to control the drilling and completion problems of shales.[22] Since these two systems were proposed, many other combinations of potassium and polymer muds have been developed and used by the petroleum industry.

Drilling Class	SSA (m^2/gm)	Characteristics	Clay Content Class	SSA (m^2/gm)	Characteristics
1	215-412	Soft, high dispersion.	1	337-412	High in Montmorillonite, some Illite.
2	168-203	Soft, fairly high dispersion.	2	203-295	Fairly high in Montmorillonite, high in Illite.
3	121-153	Medium-hard, moderate dispersion, sloughing tendencies.	3	78-215	High in interlayered clays high in Illite, Chlorite.
4	70-78	Hard, little dispersion sloughing tendencies.	4	-	Moderate Illite, moderate Chlorite.
5	-	Very-hard, brittle, no significant dispersion, caving tendencies.	5	70-153	High in Illite, moderate Chlorite.

Table 4. Classification of Problem Shales by Steiger[22]

Shale Type	Dispersion-Limiting Ability of KCl	Ability of KCl to provide sufficient hydration reduction	Is the use of KCl Suggested?
Class 1	Good	Fair	Borderline; depends on shale type.
Class 2	Excellent	Very good	Yes.
Class 3	Excellent	Very good	Yes.
Class 4 (Most)	Excellent	Very good	Yes.
Class 4 (Very hard)	Excellent	Good	Borderline; depends on shale type.
Class 5	Excellent	Very good	Yes, in most cases.
Class 5 (Highly fractured matrix)	Excellent	Fair	Borderline; depends on shale type.

Table 5. Applications of Potassium Systems For Drilling Problem Shales[17]

CHAPTER THREE
PROBLEM STATEMENT

The problem of shale stabilization and classification has been studied by many people, as seen in chapter two. However, there has been little correlation between the numerous experiments possible for shale identification and classification.

This study relates the results from the Ensilin test and other experiments conducted at the Center for Earth Sciences and Engineering (CESE) on selected clays and shales to previously published classification schemes.

The experiments performed at CESE included:

1. Ensilin Test
2. X-ray Diffraction Analysis
3. Capillary Suction Time
4. Methylene Blue Capacity
5. Atterberg Limits Test
6. Specific Surface Area Test

Although all of the above experiments were performed at CESE, the main focus of this study is with the Ensilin or fluid adsorption test.

CHAPTER FOUR
EXPERIMENTAL METHOD

This chapter focuses on the experimental method for the Ensilin test.

4.1 Experimental Apparatus

Figure 1 shows a schematic diagram of the Ensilin apparatus used. The Ensilin equipment was obtained from Houston Glass Fabricating Company (HGF apparatus) and N.L. Baroid Incorporated (SGI apparatus).

4.1.1 Coarse Fritted Disk

Part 1 is a cup fitted with a coarse fritted disk used to hold the shale sample and permit the test fluid to pass through and adsorb onto the shale. The porosity of the disk should be high enough to allow the test fluid to rapidly pass through while keeping the shale sample on the surface.

4.1.2 Glass Tubing

Part 2 is the hand blown glass tubing with two valves used to control the flow of test fluid. Valve A is a three-way valve and valve B is a two-way valve. The ends of the tubing are fitted with ground glass ball and socket joints for ease in changing the attachments.

4.1.3 Reservoir

Part 3 is a 100 ml reservoir used to hold the fluid to be tested. It also is fitted with a ground glass ball joint.

4.1.4 Pipette

Part 4 is the interchangeable pipette with the ground glass ball

joint. There are two different sized pipettes for the apparatus: a 2.0 ml capacity pipette with 0.01 ml graduation and a 0.1 ml capacity pipette with 0.001 ml graduation. The larger capacity pipette is used for medium to high swelling shales, while the smaller capacity pipette is used for low swelling clays.

4.2 Experimental Technique

This section gives a brief overview of the experimental technique; for details see Appendix A.

4.2.1 Sample Preparation

The shale samples tested were core samples, from Phillips Petroleum Company and Texaco Incorporated, and standard clays, from Mudtech, NL Baroid Incorporated, and the Department of Geology at the University of Missouri.

The core samples were first ground using a ball and mill grinder. Then all the samples were passed through a U.S. Standard Sieve size 200 mesh and dried overnight in a 100°C drying oven.

4.2.2 Equipment Preparation

The reservoir was filled with the desired testing fluid. The glass tubing and pipette were then filled with the testing fluid by operating the two valves. The cup with the glass fitted disk was inverted, covered with plastic film, and filled with the same testing fluid then attached to the glass tubing. The cup was filled this way so that air bubbles could be minimized and the maximum coverage of fluid on the coarse fritted disk could be accomplished. Once this was accomplished the entire apparatus was allowed to come to equilibrium for twenty minutes.

4.2.3 Experimental Procedure

The shale sample was weighed and placed on the coarse fritted disk. The volume of fluid adsorbed by the sample was recorded as a function of time. The amount of fluid adsorbed, in cm^3, was multiplied by the density of the fluid, in gm/cm^3, then divided by the mass of the sample, in gm, and plotted on a linear scale against time, in minutes. When the plot approached a straight line the experiment was completed. At this point the shale sample did not adsorb any more fluid, only fluid evaporation was taking place.

4.2.4 Experimental Fluids

The three different test fluids used for the experiments were:

A. Deionized water

B. 0.5% KCl in Deionized Water (Weight percent)

C. 15.0% KCl in Deionized Water (Weight percent)

The densities of the fluids were 0.99708, 1.00025, and 1.09560 gm/cm^3 respectively.[18.]

4.2.5 Shales

Ensilin tests were performed on the following shale types:

Gold Seal Bentonite (GSB)

Phillips Ekofisk (PEF)

Phillips Andrews County (PAC)

Texaco Mississippi Canyon (TMC)

Pierre Texaco (PTX)

Pierre Mudtech (PMT)

Standard Texas (STX)

Standard Arizona (SAZ)

Standard Wyoming (SWY).

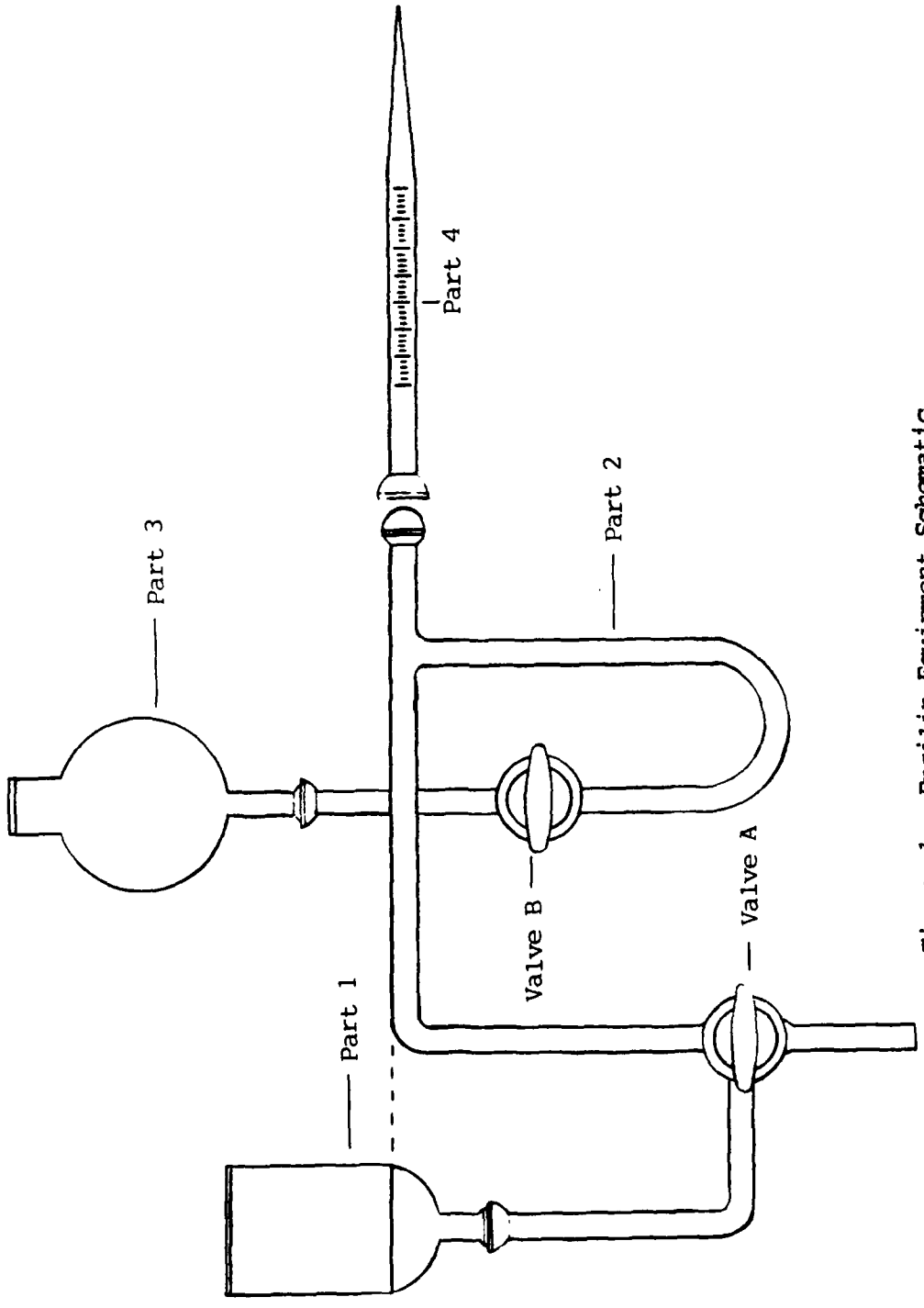


Figure 1. Ensilin Equipment Schematic.

CHAPTER FIVE
RESULTS

In this section, results from the experiments performed and a brief discussion are presented. The results are presented in the following order:

Ensilin Test

X-ray Diffraction Analysis

Capillary Suction Time

Methlyene Blue Capacity

Atterberg Limits Test

Specific Surface Area.

5.1 Ensilin Test

The Ensilin test is used to determine the unconfined swelling of a shale, measure the amount of fluid adsorbed by that shale and measure the hydration rate of the test fluid. The swelling index, SI, is equal to the mass of fluid adsorbed divided by the mass of shale. The SI values are found by extrapolating the straight line from the plot of mass of fluid adsorbed divided by mass of shale versus time to the intercept. The hydration rate is the mass of fluid adsorbed divided by the mass of shale multiplied by time. It is determined from the slope of the extrapolated line from the plot.

The experiments were carried out using both HGF apparatus and SGI apparatus. Although the HGF apparatus usually gave consistently higher results then the SGI apparatus, the overall trends for the two were similar. The differences between the two apparatus did not effect the overall

relationships presented in this thesis.

The experiments were done at three different concentrations of potassium chloride in deionized water. Table 6 shows the swelling index and the hydration rate for all the shales tested in the three different concentrations of potassium chloride in deionized water.

The SI values ranged from 0.67980 gm fluid/gm shale for PAC to 10.58905 gm fluid/gm shale for SWY in deionized water. The swelling index values classify the shales from highest to lowest as: SWY > GSB > STX > SAZ > PEF > PTX > TMC > PMT > PAC.

At concentrations of 0.5% by weight of KCl in water the SI values range from 0.67128 gm fluid/gm shale for PMT to 3.69799 gm fluid/gm shale for SWY. PAC moved above TMC in the ranking order according to the swelling index for the HGF apparatus from the deionized water case.

The values in 15% KCl/H_2O solution range from 0.39442 gm fluid/gm shale for PMT to 1.94031 gm fluid/gm shale for STX. The ranking order from highest to lowest swelling index value is: STX > SAZ > GSB > PTX > PEF > SWY > PAC > TMC > PMT for the HGF apparatus. The potassium in solution caused the change in the ranking order.

The composite plots for each apparatus and shale tested are shown in Fig. 2 through Fig. 19. The three lines on each figure represent the three different concentrations of potassium chloride in water. The individual plots and the tables of experimental data are shown in Appendix B.

SHALE SAMPLE	FLUID PERCENT KCl/H2O	HGF APPARATUS HYDRATION RATE GM FLUID/ GM SHALE MIN	HGF APPARATUS SWELLING INDEX GM FLUID/ GM SHALE	SGI APPARATUS HYDRATION RATE GM FLUID/ GM SHALE MIN	SGI APPARATUS SWELLING INDEX GM FLUID/ GM SHALE
GSB	0.0%	0.02714	5.87948	0.01405	4.34848
	0.5%	0.04513	2.88227	0.02206	3.18393
	15.0%	0.00766	1.29402	0.00598	0.95479
PEF	0.0%	0.00926	1.45458	0.00284	1.30056
	0.5%	0.00420	1.28080	0.00000	1.20030
	15.0%	0.00483	0.97820	0.00211	0.83905
PAC	0.0%	0.01153	0.75505	0.00598	0.67980
	0.5%	0.00376	0.88474	0.00000	0.80020
	15.0%	0.00396	0.69978	0.00182	0.71758
TMC	0.0%	0.01154	0.90599	0.00482	0.83927
	0.5%	0.00246	0.79724	0.00150	0.77906
	15.0%	0.00274	0.63152	0.00207	0.49642
PTX	0.0%	0.00746	1.22100	0.00963	1.13861
	0.5%	0.00218	1.02328	0.00000	0.92023
	15.0%	0.00000	1.05178	0.00000	0.74501
PMT	0.0%	0.00708	0.86579	0.00000	0.55836
	0.5%	0.00239	0.73043	0.00038	0.67128
	15.0%	0.00000	0.39442	0.00000	0.41633
STX	0.0%	0.00756	2.14680	0.00157	1.99259
	0.5%	0.00435	2.12220	0.00149	1.92087
	15.0%	0.00281	1.94031	0.00239	1.46940
SAZ	0.0%	0.00990	1.72938	0.00248	1.61642
	0.5%	0.00332	1.65076	0.00122	1.56879
	15.0%	0.00214	1.40931	0.00113	1.26658
SWY	0.0%	0.00439	10.58905	0.00249	8.15281
	0.5%	0.01190	3.69799	0.00704	3.50791
	15.0%	0.00928	0.85987	0.00879	0.95770

TABLE 6. ENSILIN TEST RESULTS

FIG. 2. COMPOSITE ENSILIN TEST-GSB

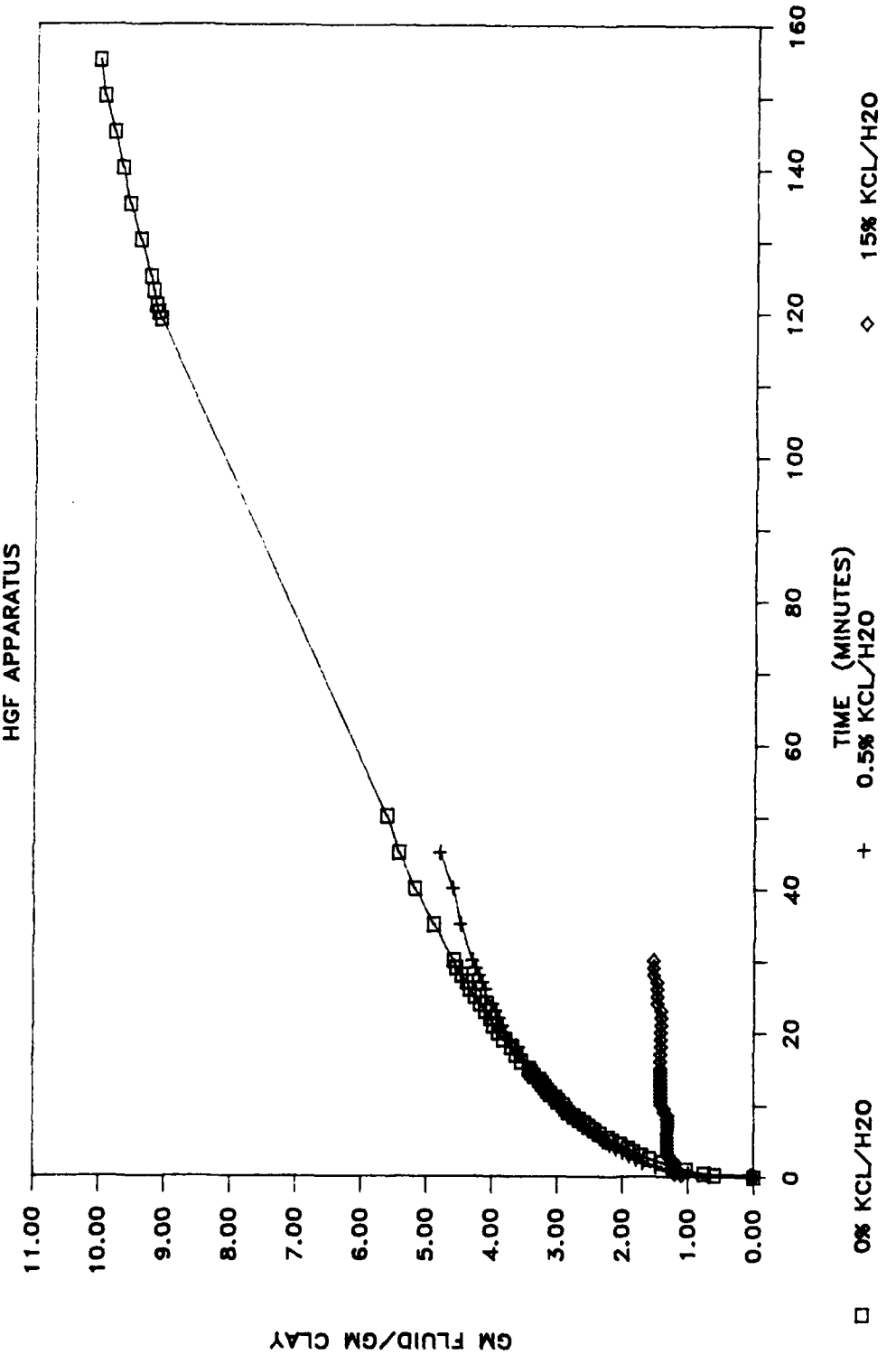


FIG. 3. COMPOSITE ENSILIN TEST-GSB

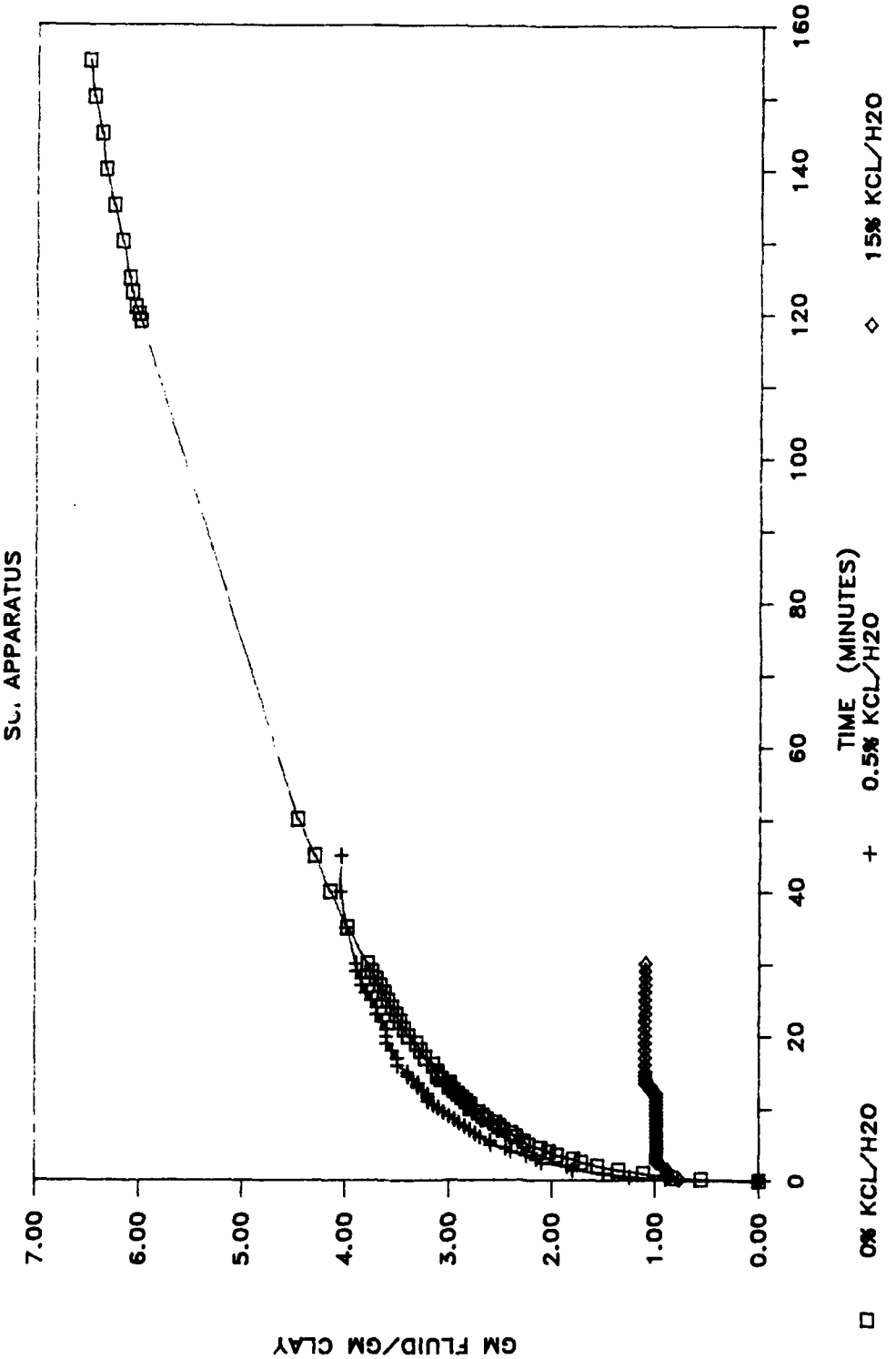


FIG. 4. COMPOSITE ENSILIN TEST-PEF

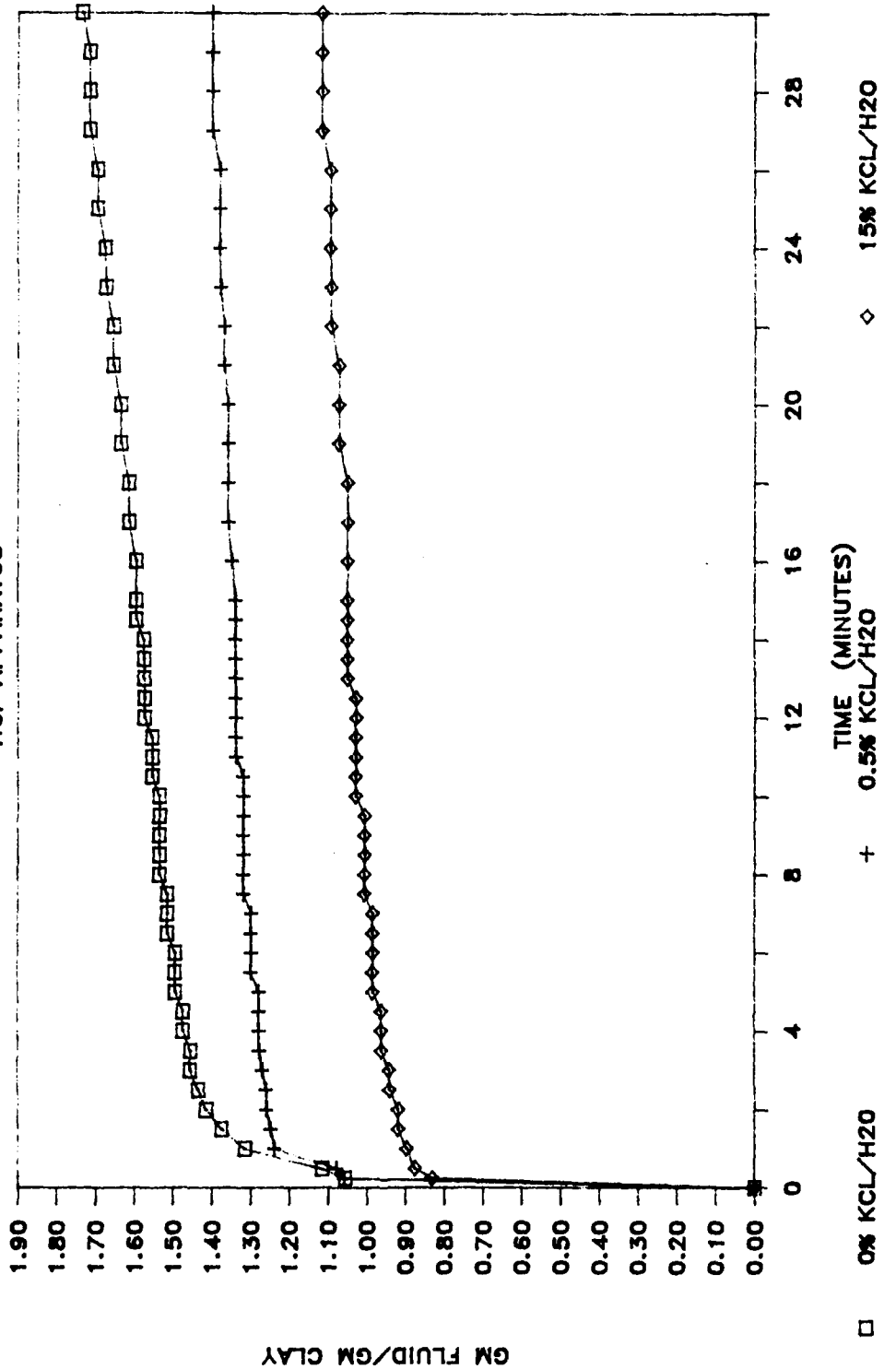


FIG. 5. COMPOSITE ENSILIN TEST-PEF

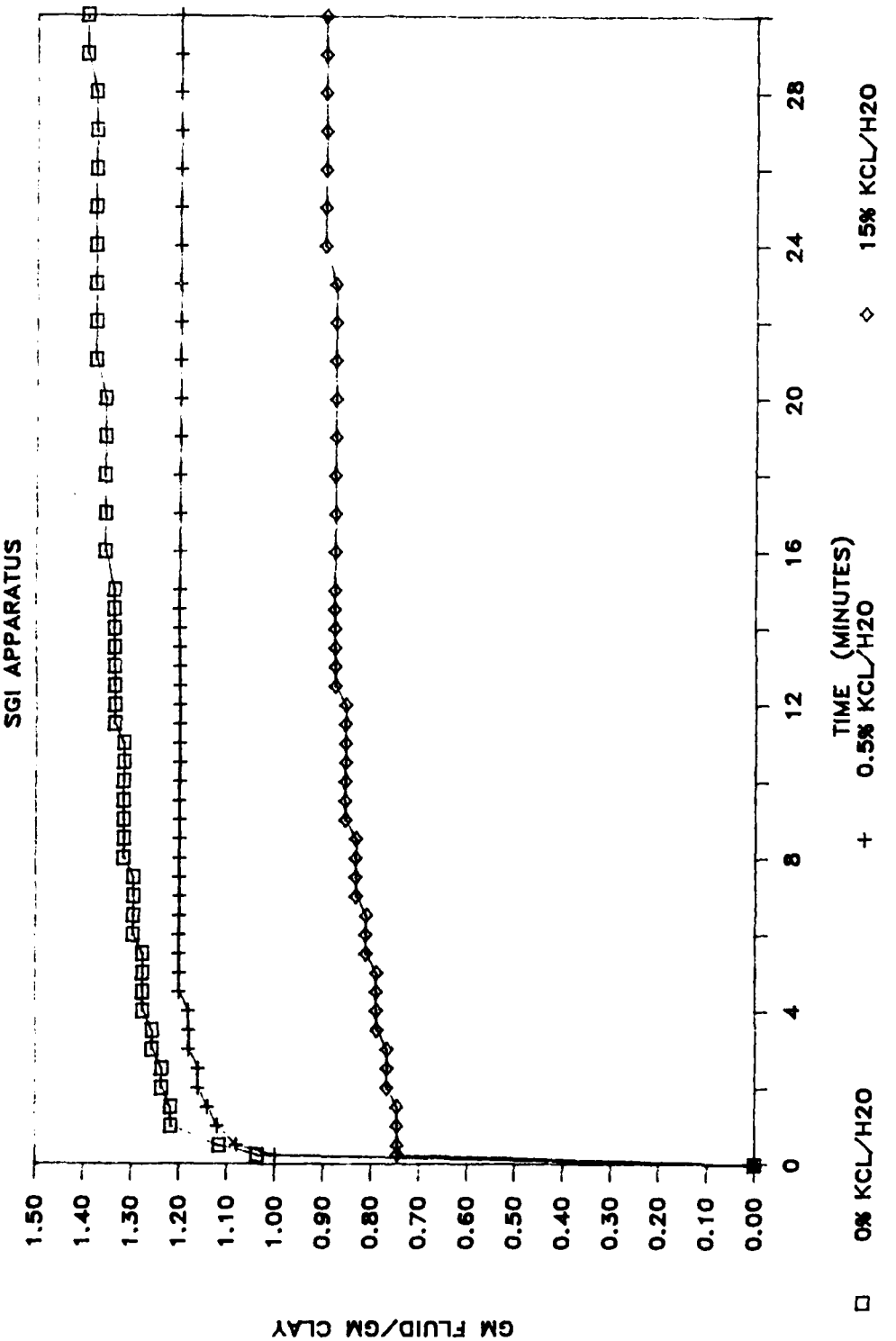
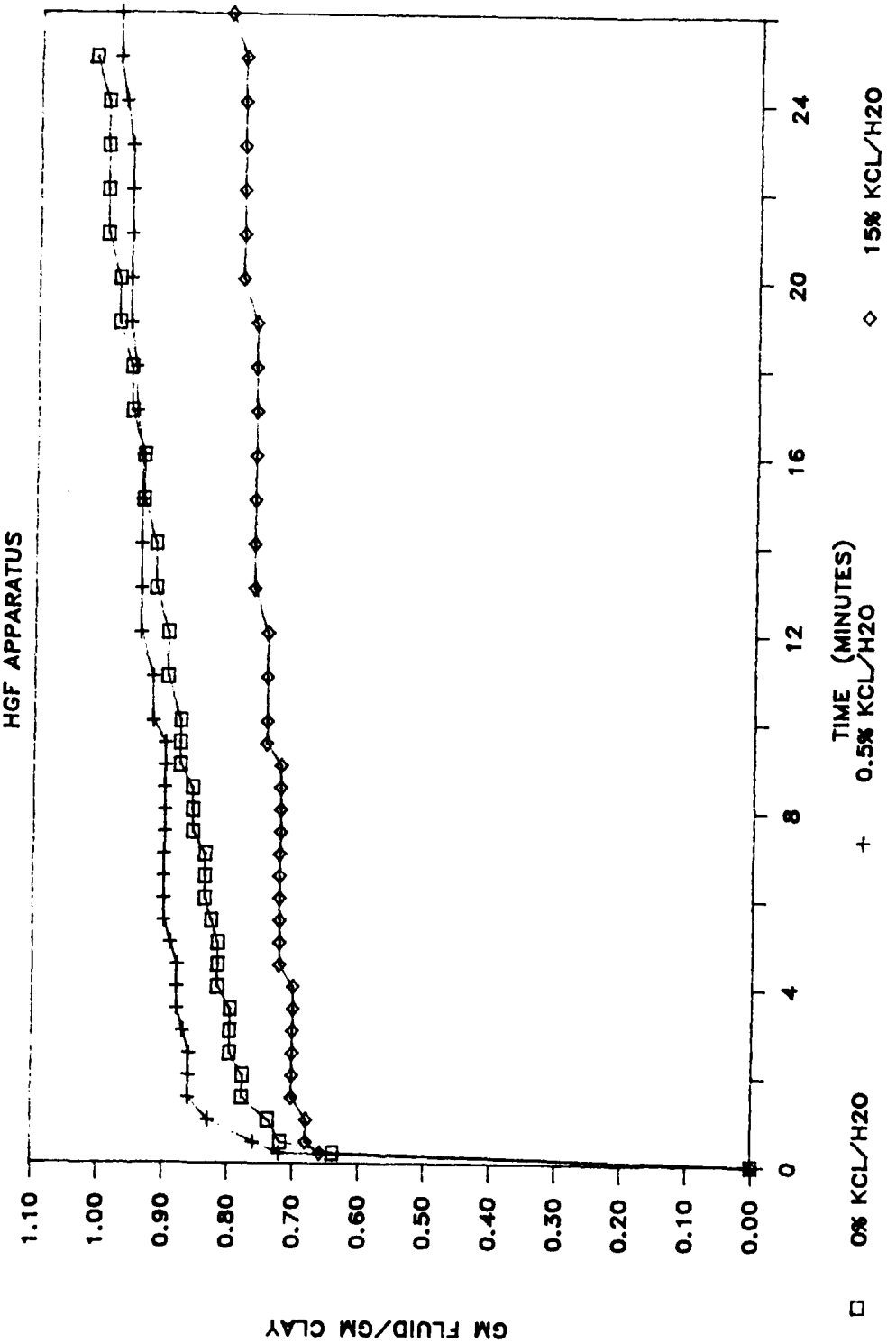


FIG. 6. COMPOSITE ENSILIN TEST-PAC



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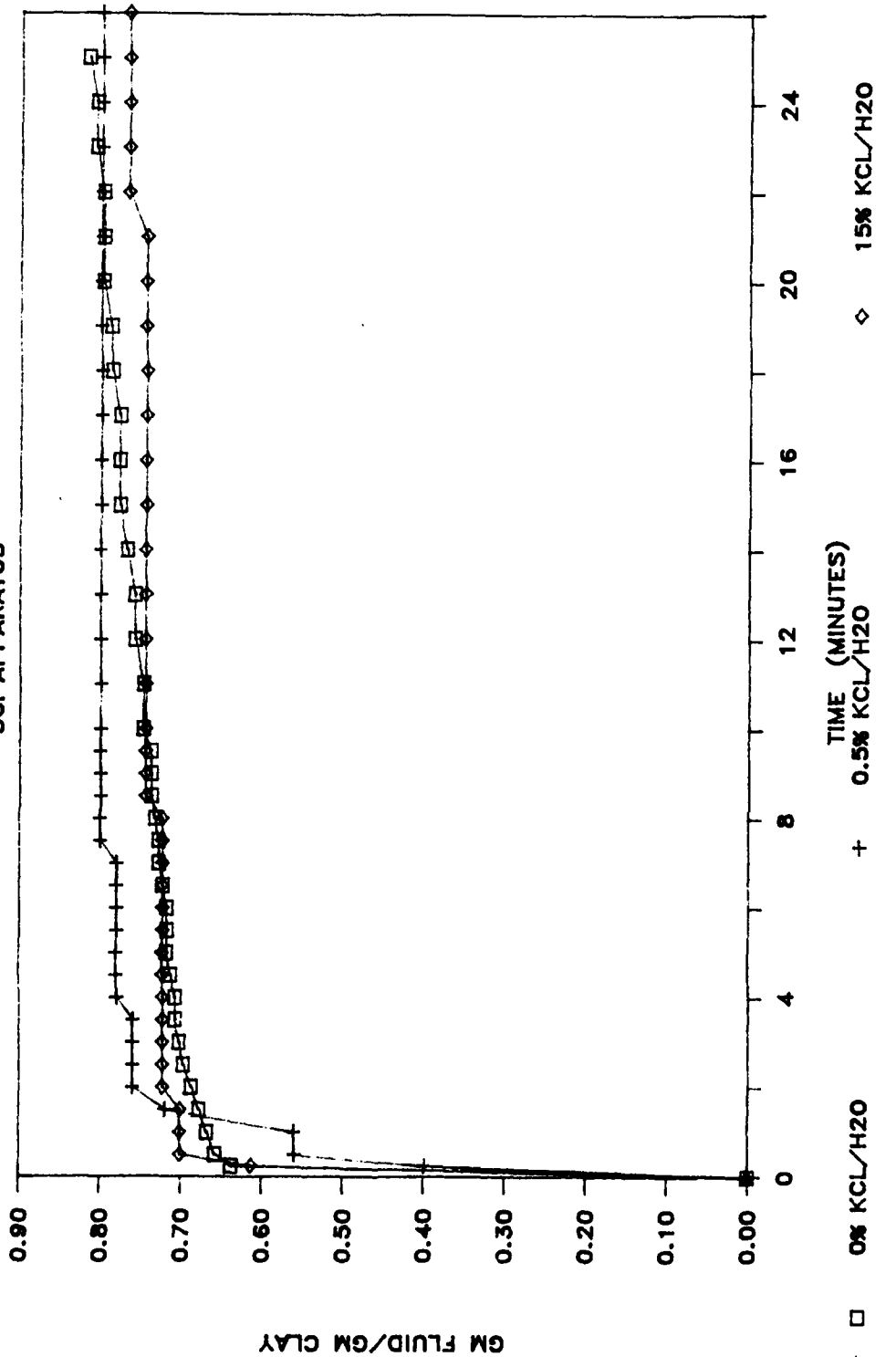

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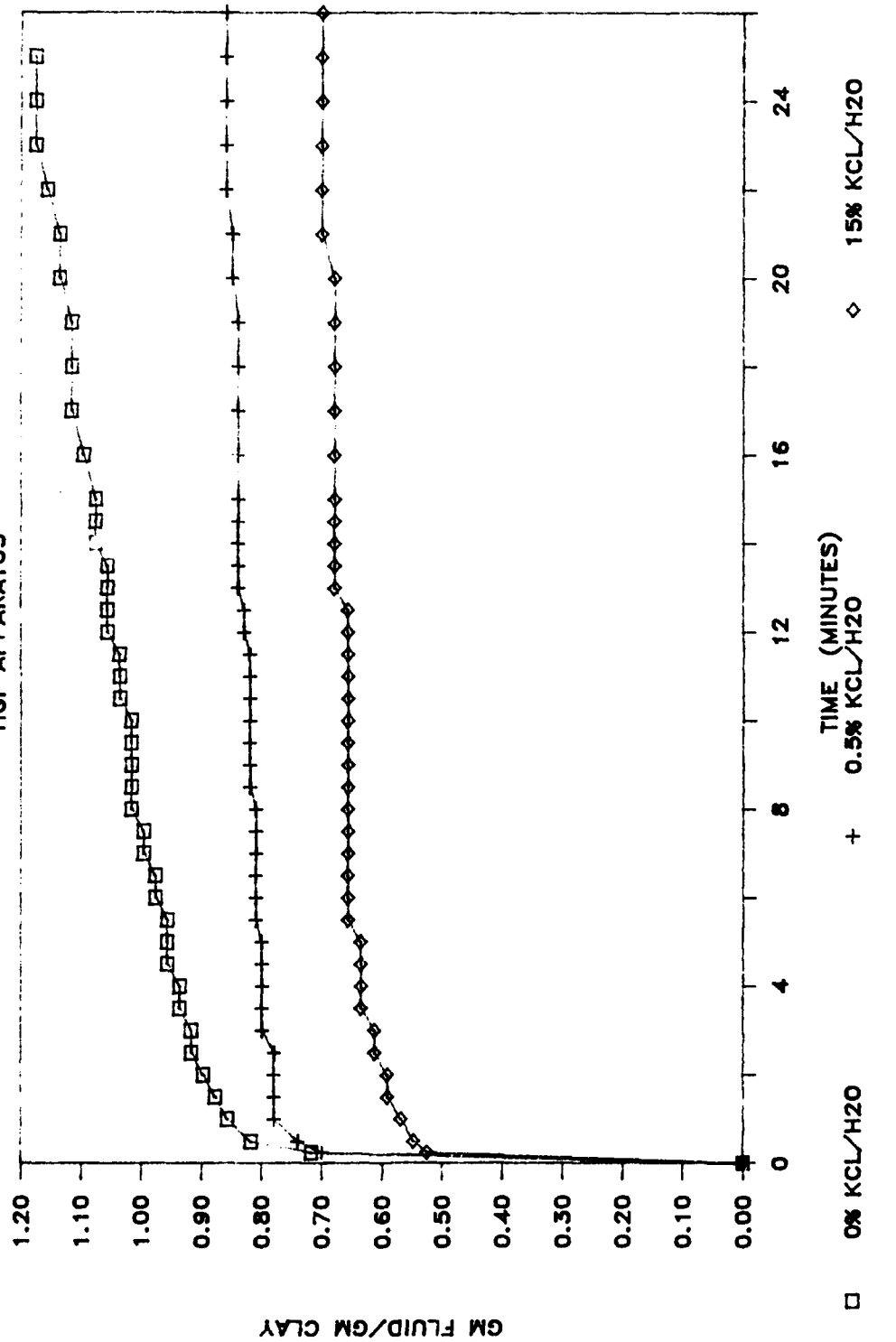
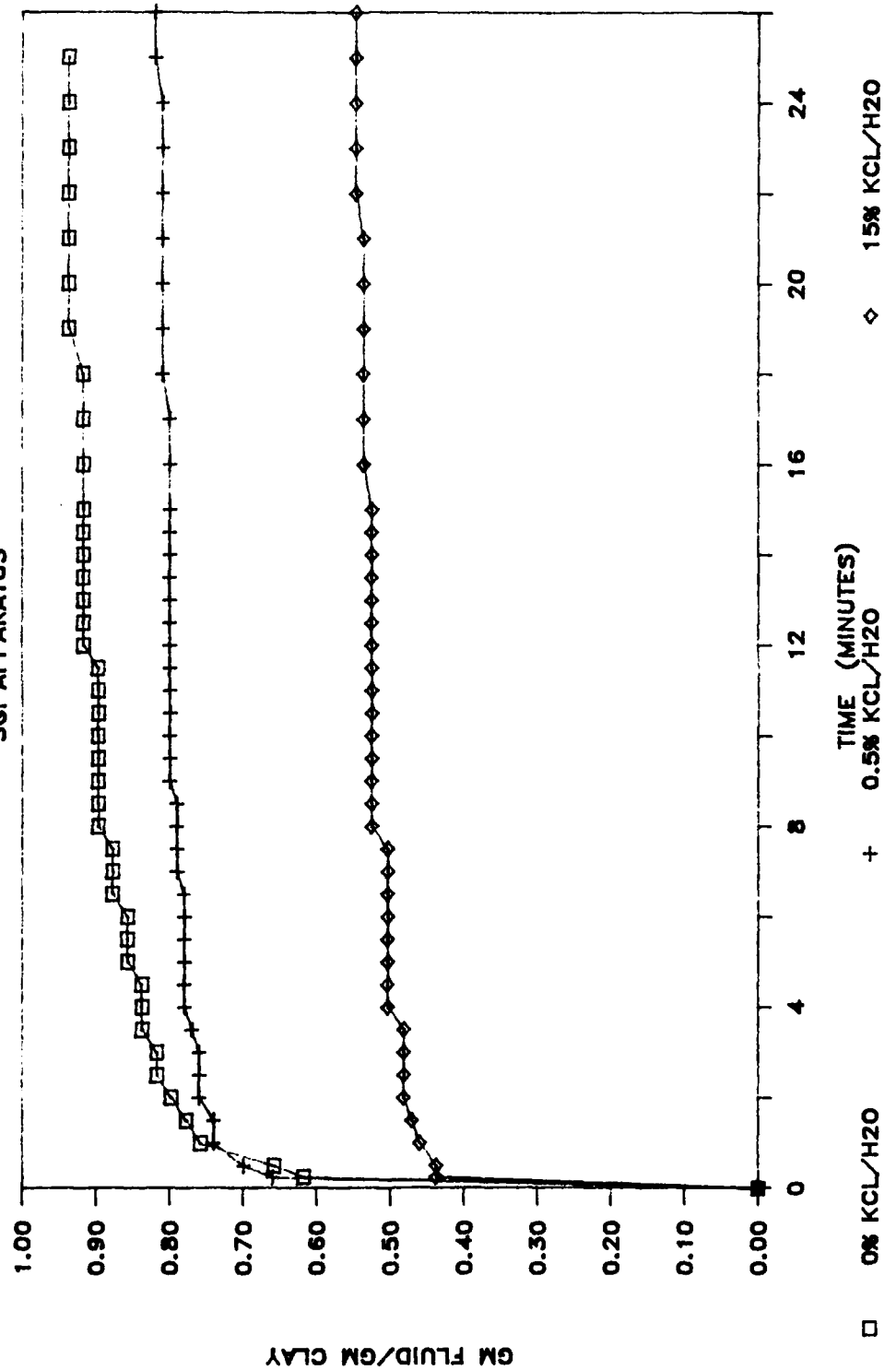


FIG. 9. COMPOSITE ENSILIN TEST-TMC



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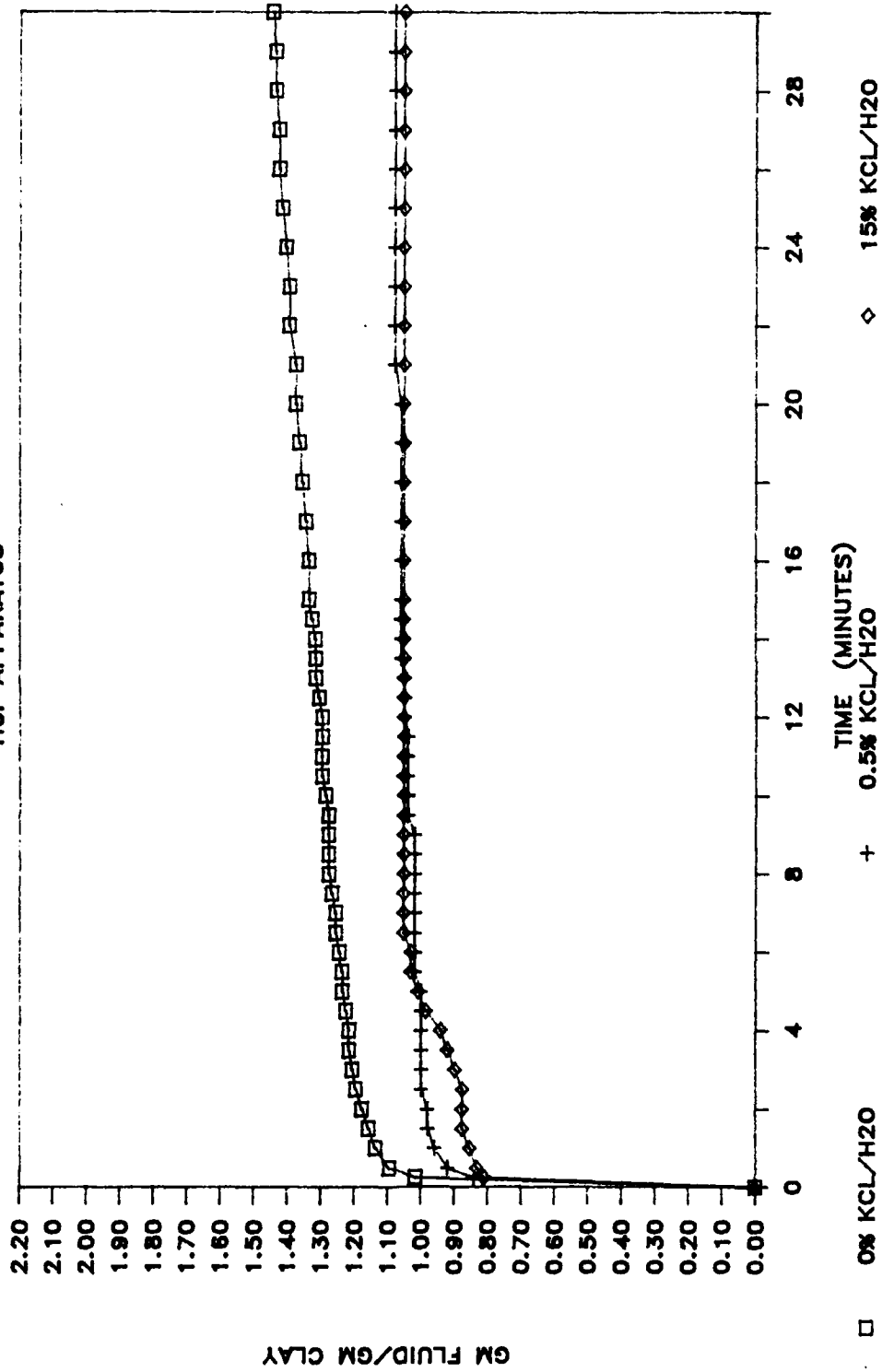


FIG. 11. COMPOSITE ENSILIN TEST-PTX

SGI APPARATUS

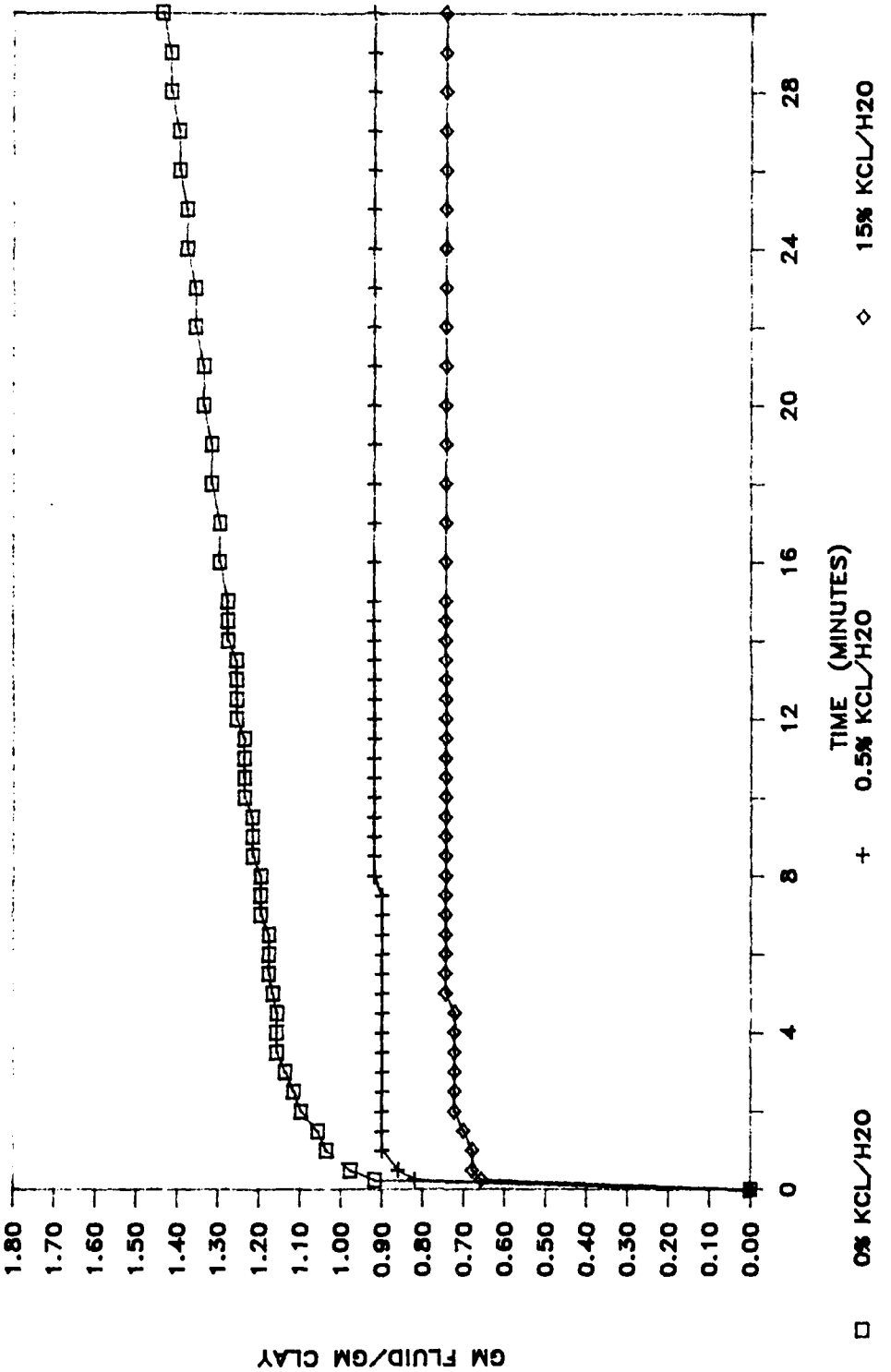


FIG. 12. COMPOSITE ENSILIN TEST-PMT

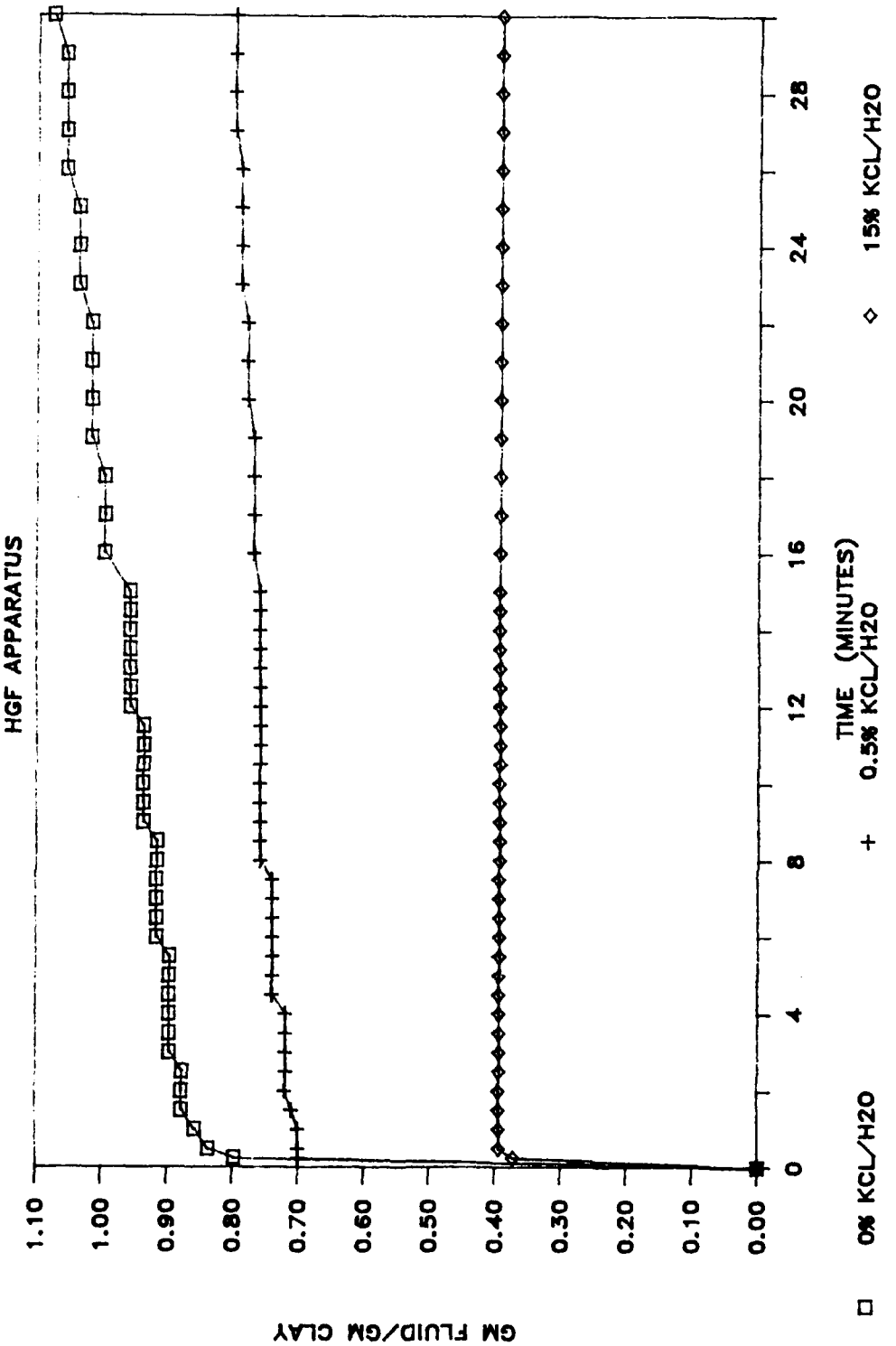


FIG. 13. COMPOSITE ENSILIN TEST-PMT

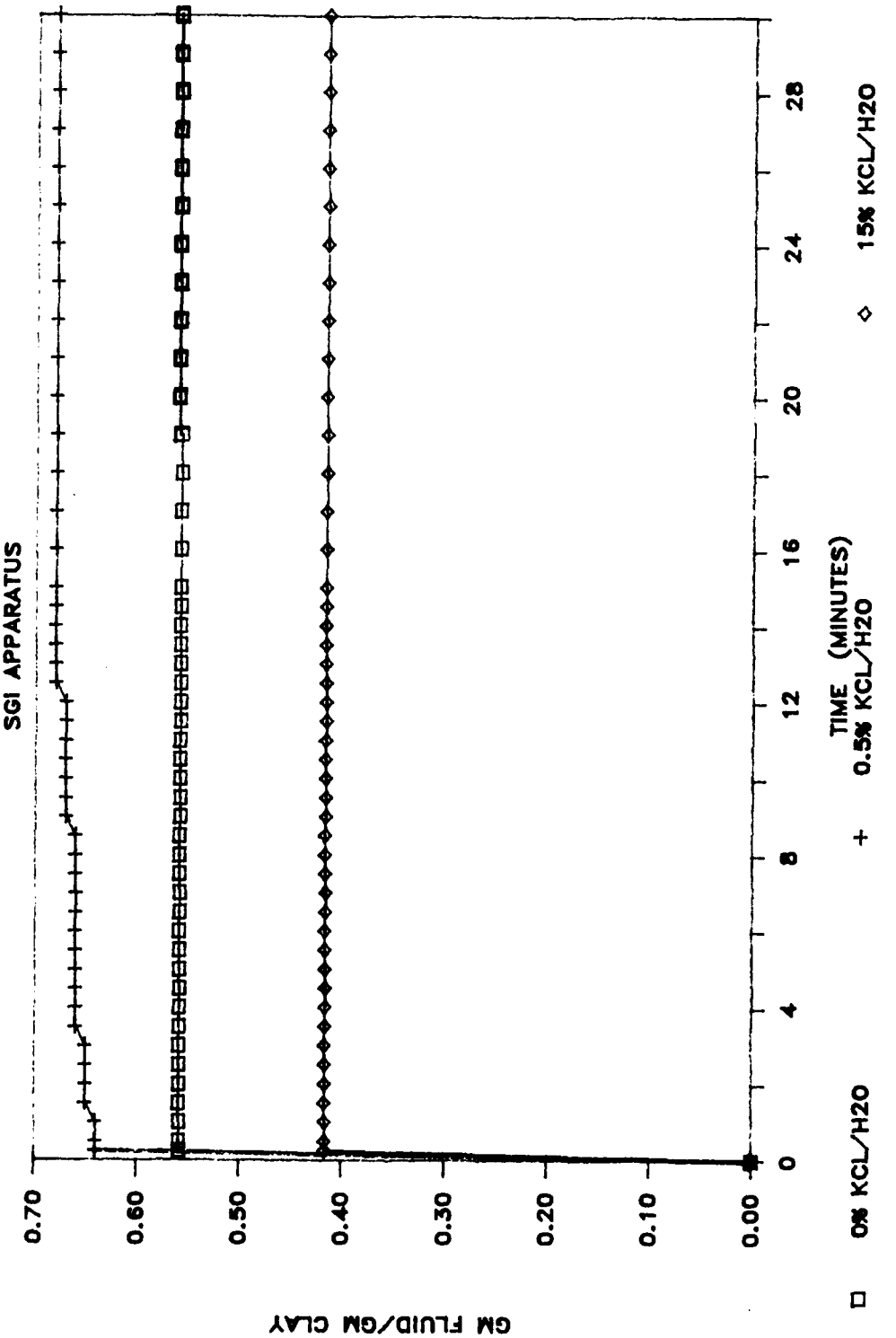


FIG. 14. COMPOSITE ENSILIN TEST-STX

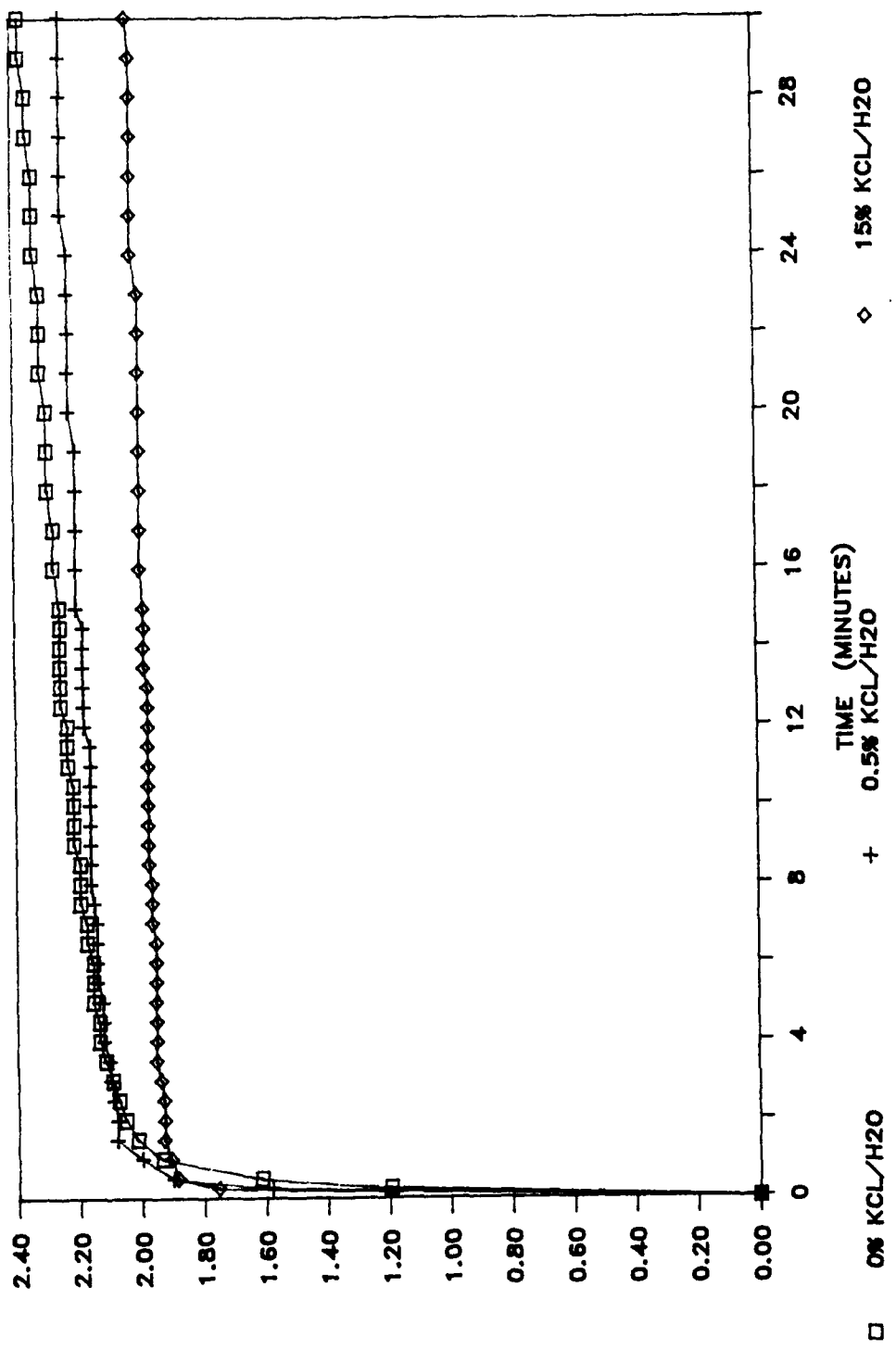


FIG. 15. COMPOSITE ENSILIN TEST-STX

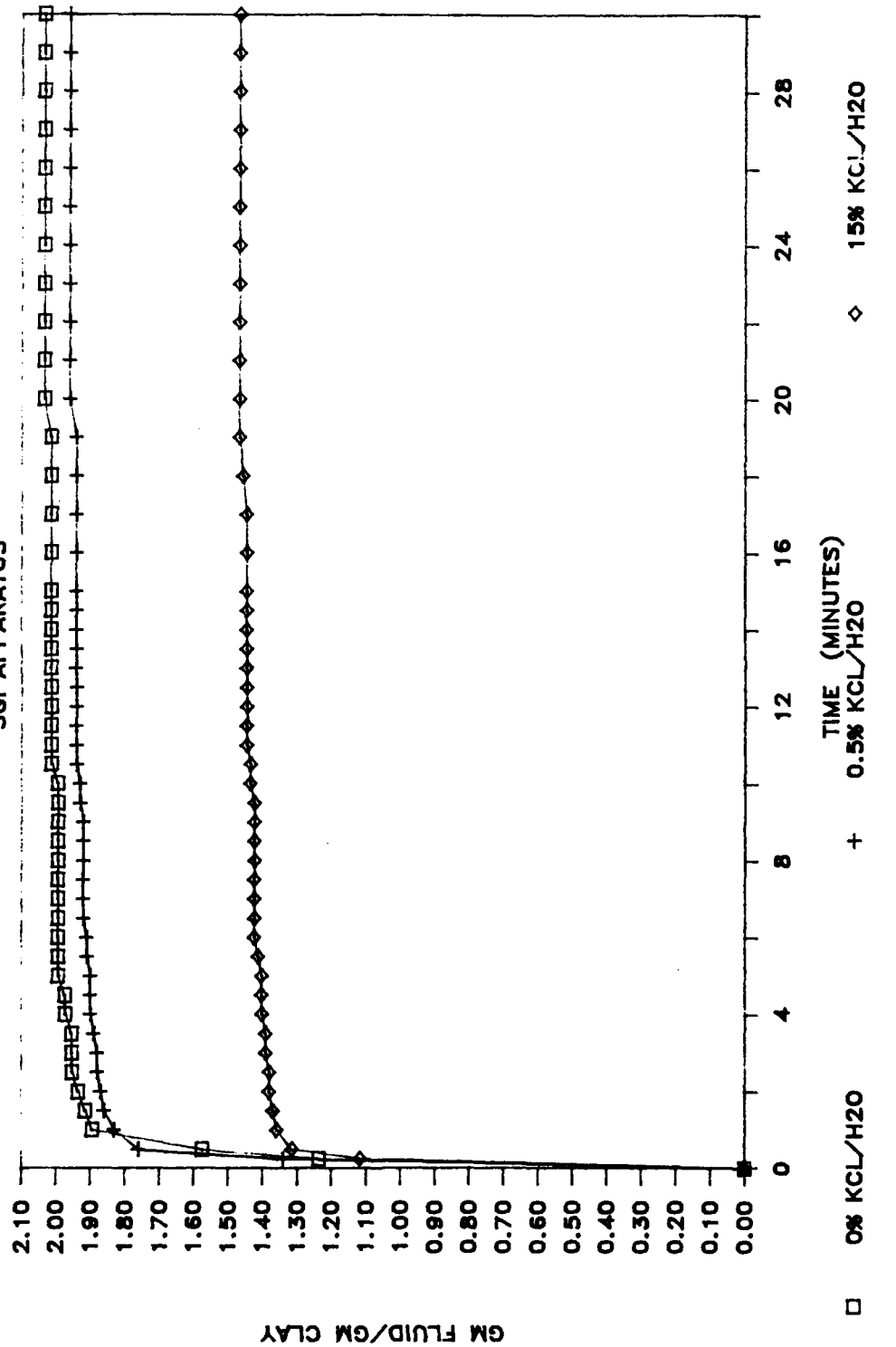


FIG. 16. COMPOSITE ENSILIN TEST-SAZ

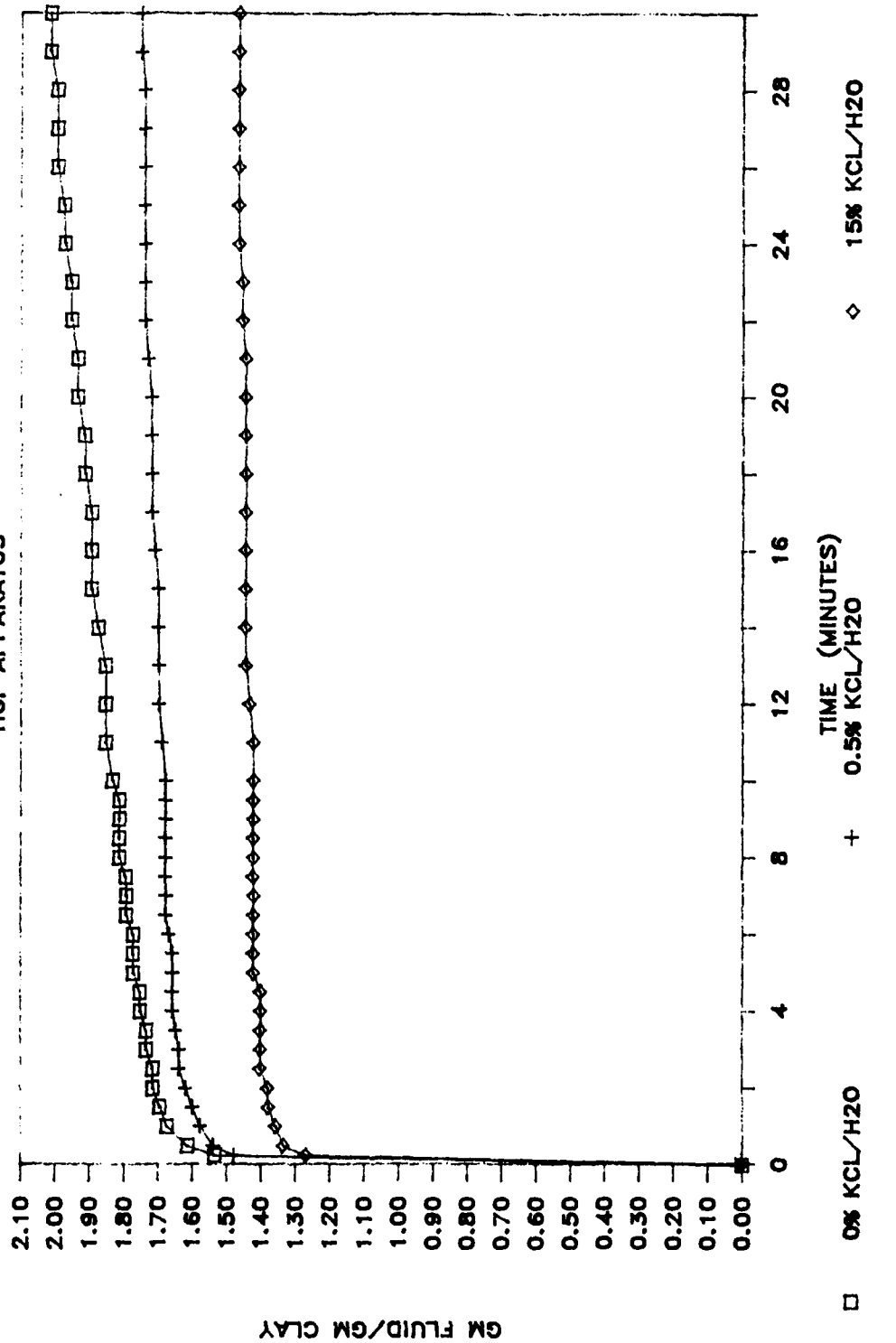


FIG. 17. COMPOSITE ENSILIN TEST-SAZ

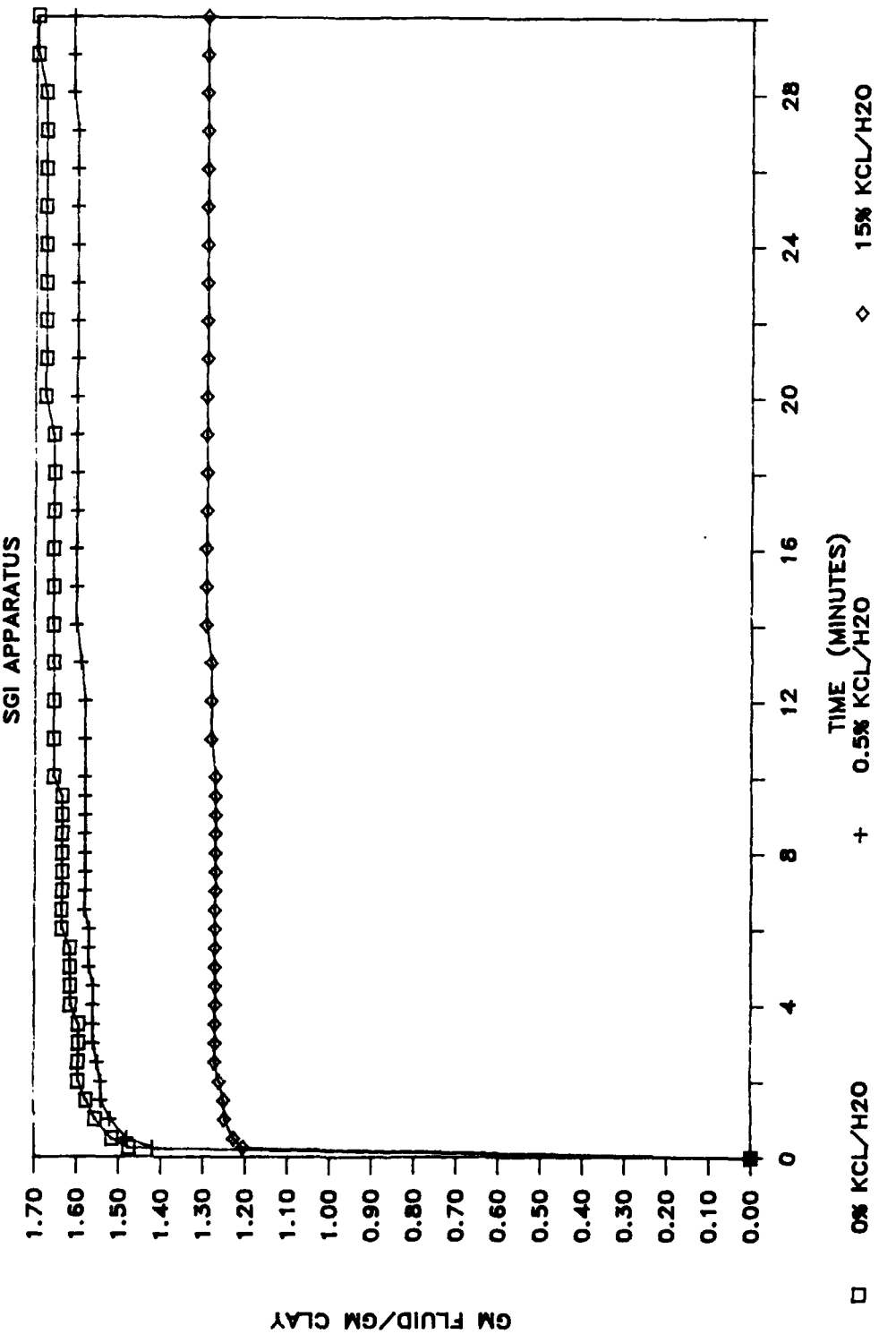


FIG. 18. COMPOSITE ENSILIN TEST-SWY

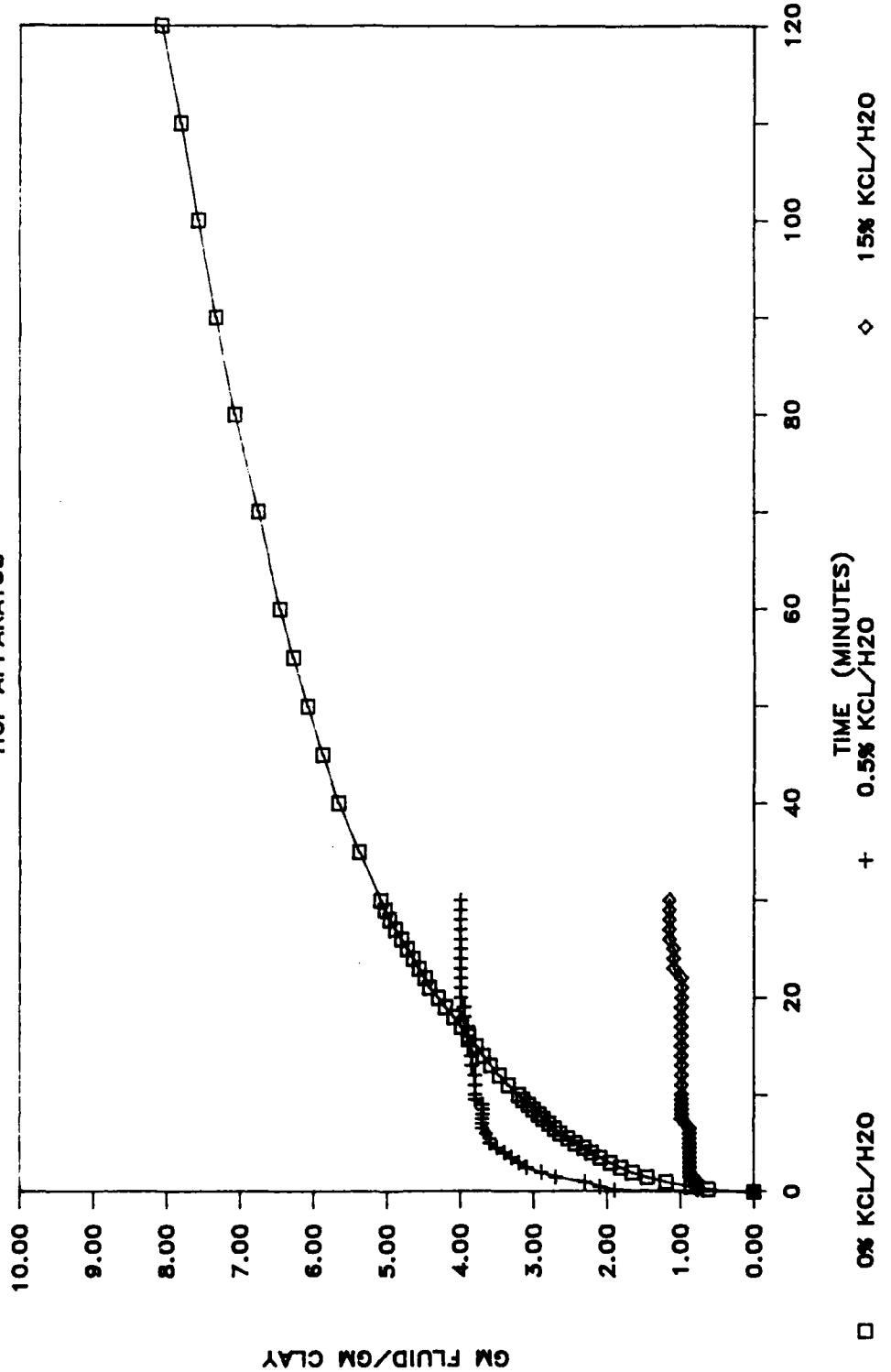
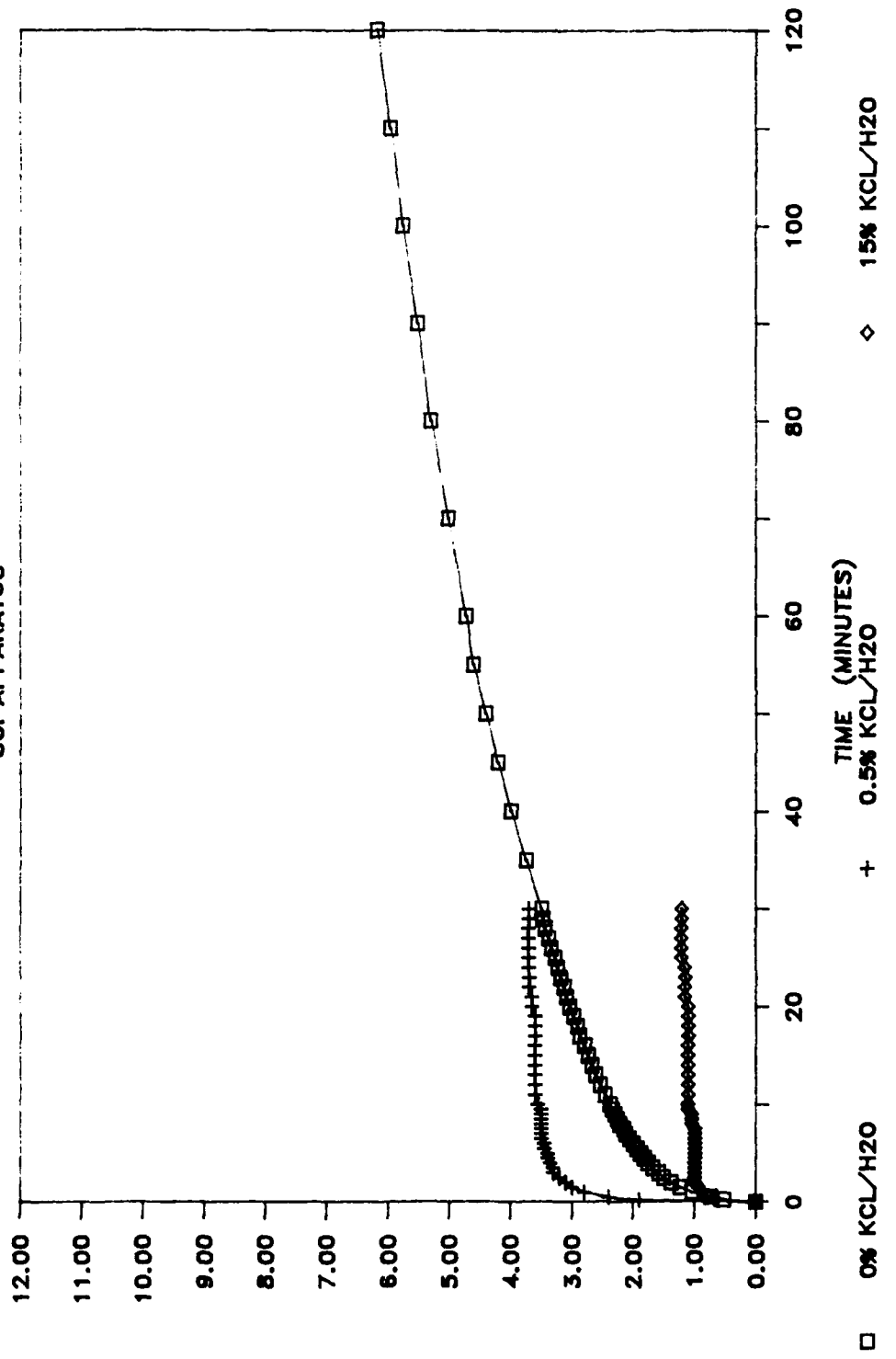


FIG. 19. COMPOSITE ENSILIN TEST-SWY



5.2 X-ray Diffraction Analysis

The X-ray Diffraction Analysis determines the amounts of the clay minerals in the shale and the overall clay content. These data are helpful in classifying a shale with regards to its dispersive and hydration properties. Table 7 shows the results from the X-ray diffraction analysis. The X-ray diffraction analysis was performed at the Exploration and Production Technology Division of Texaco.[24]

Shale	Clay (%) Fraction	Montmor-illonite	Mixed Layer	Kaolinite	Illite	Chlorite
GSB	88	100	-	-	-	-
PEF	66	53	-	28	19	-
PAC	53	-	78	12	-	10
TMC	44	-	42	25	33	-
PTX	57	82	-	-	11	7
PMT	44	76	-	5	13	6
STX	100	100	-	-	-	-
SAZ	100	100	-	-	-	-
SWY	87	100	-	-	-	-

Table 7. X-ray Diffraction Annalysis

5.3 Capillary Suction Time

The capillary suction time, CST, apparatus measures the time required for a mud filtrate to travel a given distance on a porous filter paper.[30] Table 8 on page 37 shows the dispersion profiles for a constant shear rate of 20,000 revolutions per minute (speed 7 on Waring seven speed commercial blender) and shear times from 2 seconds to 300 seconds for the different shales and fluids tested. The CST values ranged from 7.55 seconds to 4937 seconds for gold seal bentonite, sodium montmorillonite.

The CST intercept values from the experiments are shown in Table 9 on page 37. The results show that the potassium ions in solution help to

decrease the dispersion of the clay in the shale. The CST experiments were part of the tests carried out at CESE by Kevin Hart.[9]

5.4 Methylene Blue Capacity

The American Petroleum Institute, API, Methylene Blue Capacity test, MBT, is used to determine the cation exchange capacity in shales. Table 10 shows the results from the MBT experiments performed at CESE by Earl Wahrmund.[24] The MBT end point is used to help classify shales by the ions that are available for exchange.

5.5 Atterberg Limits Test

The Atterberg Limits of a shale are the liquid limit, plastic limit and plastic index. The liquid limit is the moisture content when the shale will begin to flow when slightly jarred. The plastic limit is the lowest moisture content where the shale can be rolled into 1/8 inch treads. The plastic index is the difference between the liquid limit and the plastic limit.[15] Table 10 shows the results of the Atterberg Limits test for the different shale samples tested. The Atterberg limits experiments were done at CESE by Earl Wahrmund.[24]

5.6 Specific Surface Area Test

Specific Surface Area, SSA, determines the amount of area exposed to the physical adsorption of molecules, and is usually expressed in meters squared per gram of substance. Clay minerals that are non-expanding, like kaolinite, have only external area and have a SSA in the range 10 to 70 m^2/gm. This is contrary to the expanding silicates, like montmorillonite, that have a large internal as well as external area and have SSA values up to 810 m^2/gm.[16] The SSA values were determined by the ethylene glycol mono-ethyl

ether (EGME) method as described by Carter et. al.[12] Table 10 shows the SSA values for the shales tested at CESE by Ali Mese.[14]

Fluid - 0% KCl/H2O

Shear Time	GSB	PEF	PAC	TMC	PTX	PMT	STX	SAZ	SWY
2.00	2250.00	35.10	53.30	57.25	105.50	19.55	115.10	47.70	1710.50
10.00	3215.00	59.00	66.30	91.85	205.95	23.85	179.95	95.35	1155.90
60.00	4651.00	67.45	133.50	142.40	250.45	33.65	194.80	238.45	2137.10
120.00	4937.00	66.50	51.70	145.95	234.80	38.00	581.20	353.75	1838.20
300.00	3086.00	68.60	69.70	65.45	257.50	43.50	556.75	295.05	1968.30

Fluid - 0.5% KCl/H2O

Shear Time	GSB	PEF	PAC	TMC	PTX	PMT	STX	SAZ	SWY
2.00	243.00	25.10	16.15	29.00	12.65	18.45	32.55	13.05	45.20
10.00	467.00	38.85	19.35	38.40	21.60	25.30	45.00	21.10	124.50
60.00	765.00	57.85	25.95	53.55	32.70	32.00	64.80	35.80	287.90
120.00	756.00	70.90	29.35	50.00	37.90	42.60	78.50	52.85	518.60
300.00	789.00	66.55	25.60	52.80	42.70	50.00	87.10	60.00	639.70

Fluid - 15% KCl/H2O

Shear Time	GSB	PEF	PAC	TMC	PTX	PMT	STX	SAZ	SWY
2.00	7.55	8.85	10.10	9.50	8.05	11.60	13.80	8.95	9.65
10.00	10.10	12.75	9.10	12.50	13.50	11.25	20.95	9.55	10.65
60.00	14.50	23.15	13.20	20.00	16.45	15.10	30.40	14.95	16.00
120.00	17.30	25.95	13.35	19.60	13.15	12.30	30.05	20.90	20.45
300.00	22.00	27.70	10.65	20.75	11.85	14.45	33.55	35.95	26.85

Note: All numbers in seconds.

Table 8. Capillary Suction Time - Dispersion Profile Constant Shear Rate

Shale Type	CST-INT for 0.0% KCl/H2O Fluid	CST-INT for 0.5% KCl/H2O Fluid	CST-INT for 15.0% KCl/H2O Fluid
GSB	3546.90	469.97	9.95
PEF	52.61	40.52	14.28
PAC	76.48	20.76	11.03
TMC	105.13	39.02	13.47
PTX	179.53	21.20	12.48
PMT	24.61	24.18	12.14
STX	176.68	45.68	20.70
SAZ	131.98	22.15	9.13
SWY	1617.96	135.67	11.17

Table 9. Capillary Suction Time Intercept

Shale Sample	MBT (me/100gm)	Atterberg Limits Plastic Index	Liquid Limits	Plastic Limits	SSA (m^2/gm)
GSB	91.00	504.00	555.00	51.00	574.00
PEF	30.00	38.00	64.00	26.00	249.00
PAC	18.00	12.00	28.00	16.00	182.00
TMC	21.00	26.00	42.00	16.00	166.00
PTX	27.00	41.00	70.00	29.00	153.00
PMT	31.00	27.00	47.00	20.00	193.00
STX	82.00	85.00	115.00	30.00	540.00
SAZ	129.00	57.00	100.00	43.00	647.00
SWY	94.00	619.00	670.00	51.00	602.00

Table 10. Overall Shale Properties - MBT, Atterberg Limits, SSA

CHAPTER SIX
DISCUSSION

In this chapter the Ensilin test results from chapter five are analyzed individually and then compared with the other experiments.

6.1 Montmorillonite and KCl Effect

The swelling index values for the montmorillonite standard clays, SWY, GSB, STX, and SAZ, were the highest of all the shale samples. This was an expected result since they are all 100% montmorillonite and very close to 100% clay minerals. As discussed in chapter two, the substitution of magnesium, Mg^{2+}, for aluminum, Al^{3+}, in the clay layer octahedral, causes a negative charge at the clay mineral surface. This allows sodium and calcium ions to adsorb onto the surface of the clay mineral.

When a sodium montmorillonite is exposed to water, the unhydrated clay begins to swell, as well as the sodium ions that were holding the clay layers together. The sodium ionic diameter swells from a value of 1.96 Angstroms unhydrated, (1 A^o = 10^{-8}m), to a value of 15.8 A^o hydrated.[19] Even though it increased this much, the sodium ion is still not large enough to fill the 20 A^o space between the clay layers and prevent the water from causing continued swelling.[25]

On the other hand, in a calcium montmorillonite, the calcium ionic diameter swells from an unhydrated value of 2.12 A^o to 19.2 A^o hydrated.[19] This hydrated calcium ion is large enough to prevent further swelling because it fills the space between the clay layers and does not allow any water

molecules to get through.

The experimental results from the Ensilin test support these theories. In deionized water the sodium montmorillonites, SWY and GSB, had very high swelling index values of 10.59 and 5.88 gm fluid/gm shale. In comparison the calcium montmorillonites, STX and SAZ, had much lower swelling index values of 2.15 and 1.73 gm fluid/gm shale.

When the clays were exposed to the fluid with potassium chloride in solution the results began to change. The potassium ion in solution was already hydrated, having an ionic diameter of 10.64 A°, yet it was still small enough to enter the shale sample that had not been totally hydrated and prevent the water from causing further hydration.

This is what happened in the case of the 0.5% potassium chloride in water solution. The swelling index values for SWY and GSB, (3.70 and 2.88 gm fluid/gm shale), are significantly lower than the previous results with no potassium in solution. On the contrary, the KCl in solution seemed to have little effect on the STX and SAZ swelling index values.

This is seen more clearly when the results from the experiment with 15% KCl/H_2O in solution are investigated. The SWY and GSB swelling index values have decreased even further, showing that the potassium ions in solution are preventing almost all of the swelling. The 15% potassium solution decreased the SI value approximately 92% for SWY and 78% for GSB from their original swelling in deionized water. The calcium montmorillonite clays - STX and SAZ, on the other hand, have only decreased 18% and 10% respectively from the SI value in deionized water.

These trends seem to indicate that the potassium ions in solution

readily exchange with the sodium ions in the montmorillonite to prevent swelling, but not as easily with the calcium ions in calcium montmorillonite.

6.2 Remaining Shales and KCl Effect

Out of the remaining shale samples PEF had the next highest swelling index value in pure water. It is composed mostly of montmorillonite and kaolinite clays. The total clay content is 66% with montmorillonite making up 53% of that portion. This causes the swelling index value to be somewhat high but the kaolinite clays help to keep the value lower. PEF should be ranked as a medium swelling clay at 1.45 gm fluid/gm shale. The potassium ions in solution do lower the swelling index value for PEF but not as significantly as SWY or GSB.

Even though the PTX sample has less total clay than the PEF sample, the amount of montmorillonite is higher, which causes the swelling index value at 1.22 gm fluid/gm shale to be close to the PEF value. The swelling index value for this shale also decreased as it was exposed to the potassium chloride solution.

However, in the 15% potassium solution the swelling index value of PEF was lower than that for PTX. This seems to show that the montmorillonite in the PTX sample is the calcium type while the montmorillonite in the PEF sample is the sodium type. This would explain why the two clay sample switched positions in the ranking by the swelling index values.

The last three shale samples, TMC, PMT and PAC, had the lowest swelling index value of all the shales tested. Even in the potassium chloride solutions these three shales had the lowest swelling index values. The order among these shales changed some when they were exposed to the 0.5% KCl

solution. TMC and PAC are very similar in clay composition with a high amount of mixed layer (illite and montmorillonite) and kaolinite clay minerals. As previously discussed, aluminum, Al^{3+}, substitutes for silicon, Si^{4+}, in illite clay minerals causing strong negative charges at the surface of the mineral. This allows potassium ions to adsorb to the clay mineral and help hold the clay layers together. This is why illites do not swell as much as montmorillonites.

6.3 CST and Ensilin

The capillary suction time experimental results from Table 8 show the same trends as the swelling index from the Ensilin experiment. Both show a general decreasing trend when they are exposed to fluids containing potassium ions in solution.

When the potassium ions in solution interacted with the sodium montmorillonites in the Ensilin experiment they helped to prevent swelling. In the case of the capillary suction time experiment, the potassium ions help to prevent dispersion of the clay minerals. Similar results are seen in comparing the changes between the sodium and calcium montmorillonites. SWY and GSB show a very large decrease in the dispersion profile from pure water to 0.5% KCl solution. Then the dispersion profile decreases further in the 15% KCl solution, even less than the dispersion profile for STX and SAZ. The reasons for this are similar to those stated previously, that the potassium ions penetrate into the clay layers before the layers begin to expand, thus helping to hold them together better.

6.4 Atterberg Limits and Ensilin

The Atterberg Limits of the shales tested show similar trends to the

Ensilin experiment. The Atterberg Limits of the shale relate to the amount of moisture that a shale can adsorb. Figure 20 shows a plot of the plastic index versus the swelling index (Ensilin intercept) from the HGF apparatus. The general trend is a linear relationship between the two. The plastic index is the difference between the liquid limit and the plastic limit of the shale. The sodium montmorillonite shales, SWY and GSB, are in the upper right of the figure. The large value for the plastic index indicates that the shale can adsorb a large amount of water before it will flow and that only a small amount of water is necessary to hold the clay together.

Figure 21 shows that a similar linear relationship exists between the liquid limit and the swelling index. Again the sodium montmorillonite shales are to the upper right of the curve. In contrast, the plastic limit does not show the same linear relationship that the liquid limit and plastic index show. Figure 22 shows that the plastic limit behaves logarithmically with respect to the swelling index.

6.5 MBT, SSA and Ensilin

The methylene blue capacity and specific surface area experiments show how reactive a particular shale can be. There is no ideal relationship between the methylene blue capacity and the swelling index. Figure 23 shows the methylene blue capacity plotted versus the swelling index on a linear scale. There are basically two groupings on the plot, 1) the montmorillonite shales on the upper portion of the plot and 2) the other shale types in the lower left corner. The figure shows that any swelling index value above approximately 1.5 gm fluid/gm shale will fall in the upper portion of the plot and could be classified as a high swelling clay.

Figure 24 shows how the specific surface area plots versus the swelling index. On this plot there are also two main relationships. The first is a generally linear relationship from small values of swelling index to approximately 1.5 gm fluid/gm clay. From that point there is another linear relationship at the top of the figure. The relationship at the top is for high swelling montmorillonites shales.

6.6 Shale Classification

As seen in chapter two, shales have been classified by numerous methods and by various experiments. The first classification presented was Kelly's (1968) classification scheme in Table 1. He classified problem shales according to clay content and characteristics.[11] Table 11 shows how the shales tested would be classified according to Kelly. It also shows the Ensilin values that correspond to each classification.

Class	Shale Type	Ensilin Intercept Gm Fluid/Gm Shale
A	SWY, GSB, STX, SAZ	1.72 - 10.59
B	PEF, PTX	1.22 - 1.45
C	PMT	0.86
D	TMC, PAC	0.76 - 0.91

Table 11. Kelly's Classification Scheme with Ensilin Values

The next classification scheme presented was by Mondshine (1969)[15]. He used the methylene blue capacity as his primary classification mechanism. Again all of the montmorillonite standard clays would fall in Class A. Also falling in Class A would be: PEF, PTX, and PAC. The remaining two shales, TMC and PAC, would fall into Class B.

O'Brien and Chenevert's classification scheme was presented in Table 3. This classification scheme was based on the total and individual clay content, and the dispersive properties of shales.[17] As with the previous two classification schemes, the four standard shale samples would classify as Class 1. The remaining shales have characteristics of one class but clay content of another.

Because of this situation, Steiger developed his own modified version of O'Brien and Chenevert's classification scheme. This modified version used the specific surface area as well as the clay content to classify the shales and was shown in Table 4. The first number in the classification is for the drilling class and the second is for the clay content class. The four standard shales still fall into Class 1,1. PEF now falls into Class 1,2. PTX falls into Class 3,3. The three remaining clays are classified by the Class 2,3. Table 12 below shows the Ensilin intercept values for Steiger's classification scheme.

Class	Drilling Ensilin Int. Gm Fluid/Gm Shale	Clay content Ensilin Int. Gm Fluid/Gm Shale
1	1.45 - 10.59	1.73 - 10.59
2	0.76 - 0.91	1.45
3	1.22	0.76 - 1.22

Table 12. Steiger's Classification Scheme with Ensilin Values

Table 13 shows a summary of the shales tested and their classification schemes according to the Kelly, Mondshine, and O'Brien and Chenevert.

Shale	Kelly Class	Mondshine Class	O'Brien/Chenevert Class
SWY	A	A	1,1
GSB	A	A	1,1
STX	A	A	1,1
SAZ	A	A	1,1
PEF	B	A	1,2
PTX	B	A	3,3
PMT	C	A	2,3
TMC	D	B	2,3
PAC	D	B	2,3

Table 13. Shale Classification Summary

FIG. 20. PLASTIC INDEX vs ENSILIN INT.

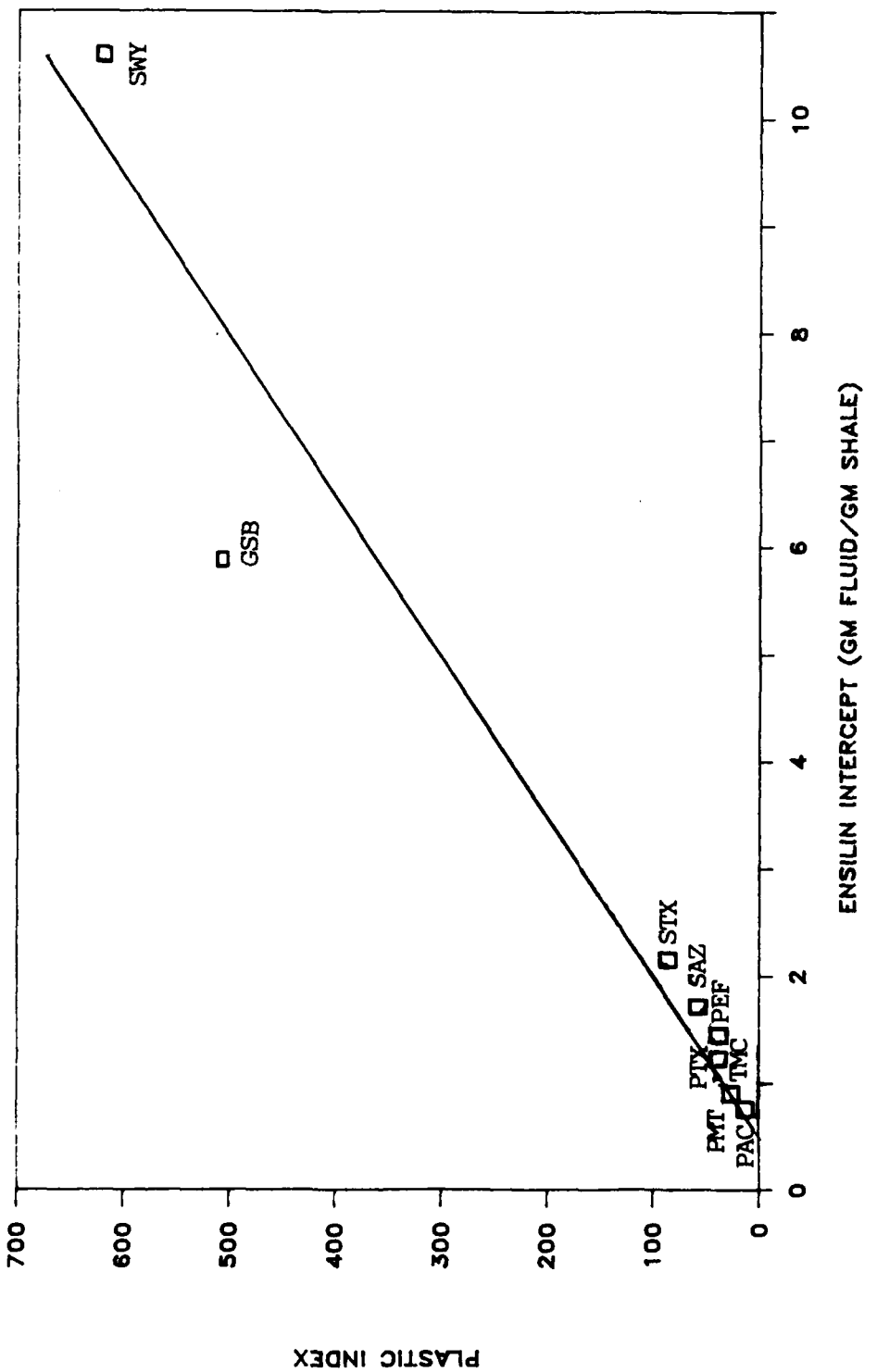


FIG. 21. LIQUID LIMIT vs ENSILIN INT.

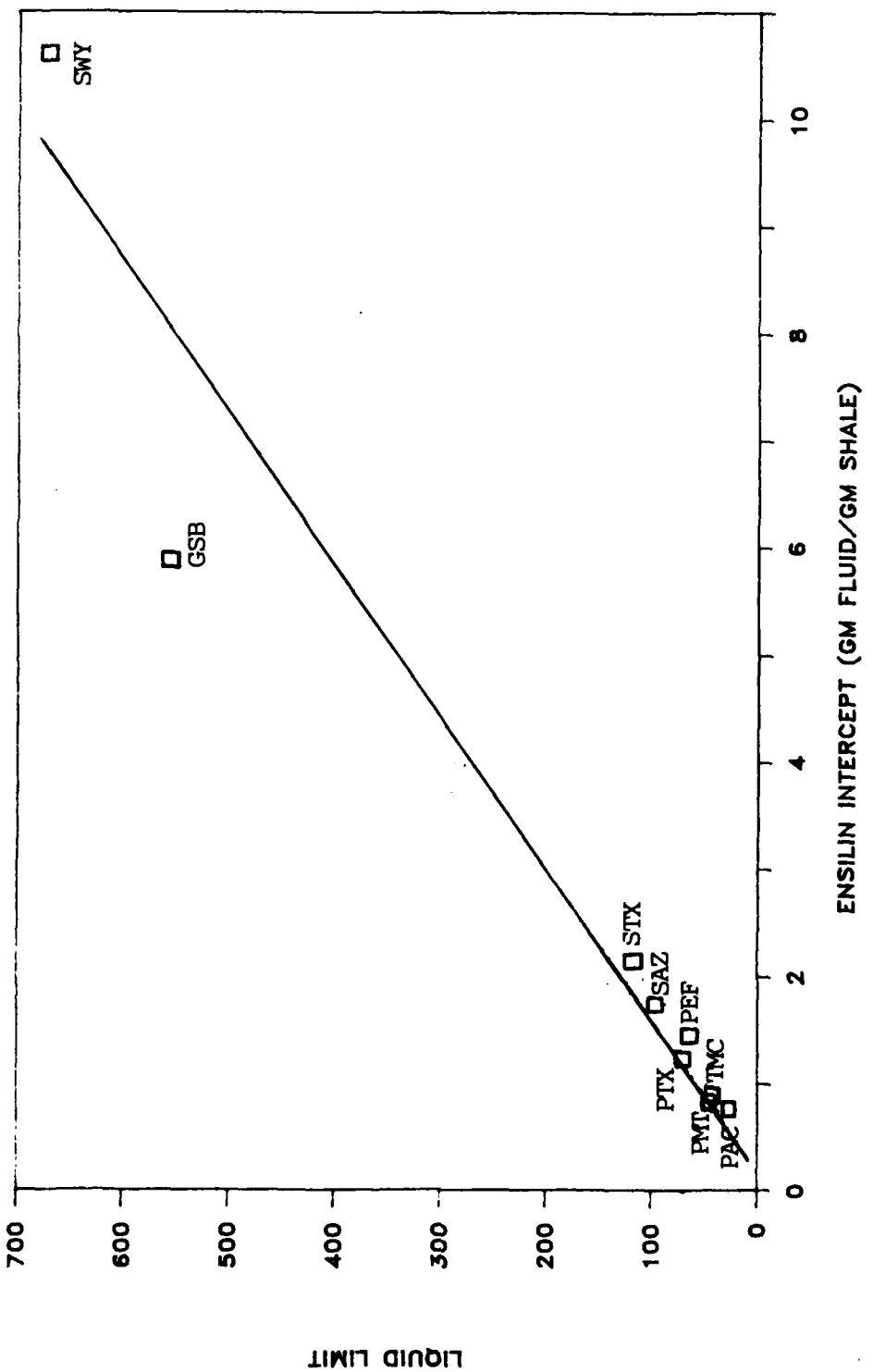


FIG. 22. PLASTIC LIMIT vs ENSILIN INT.

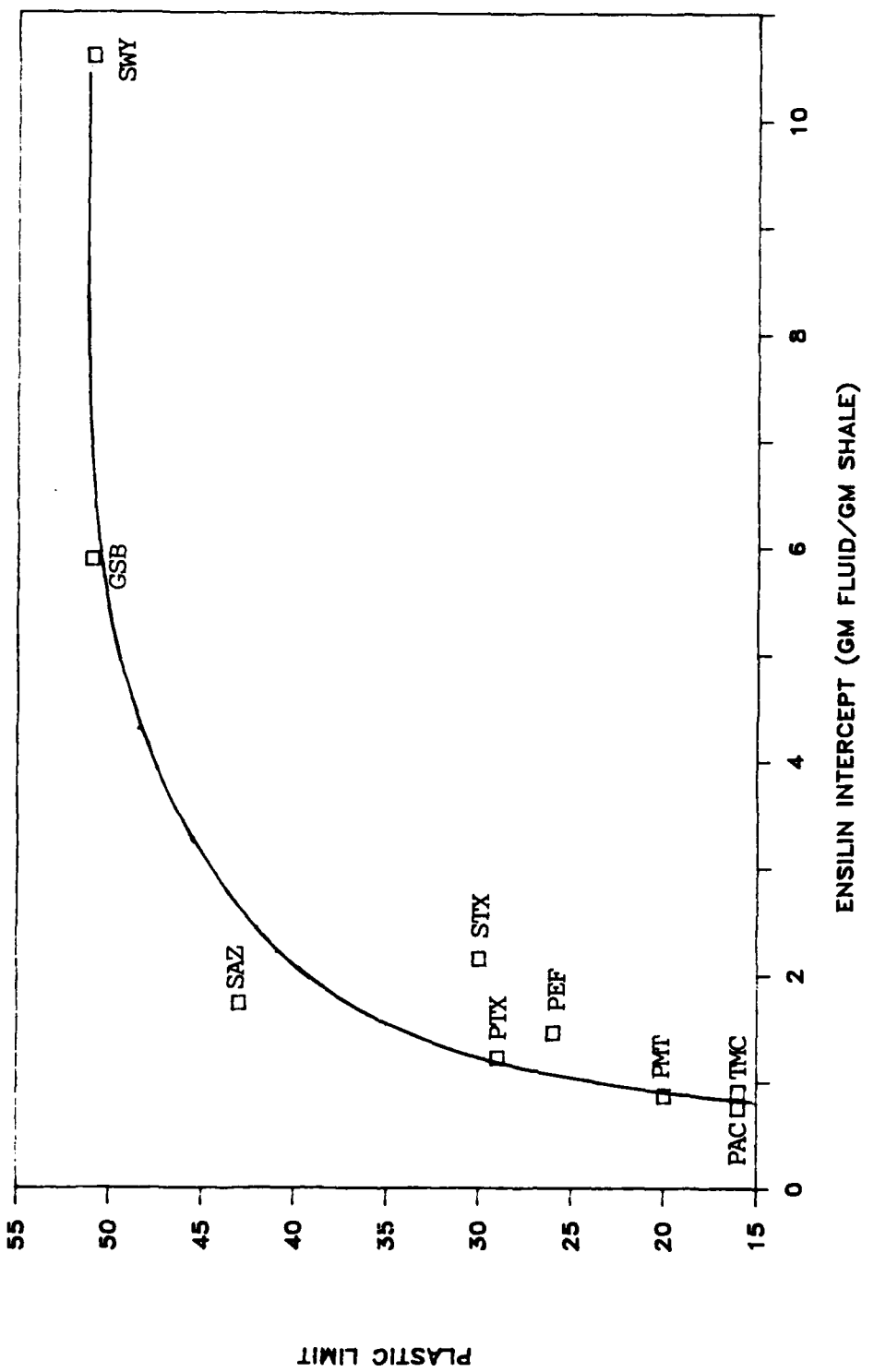


FIG. 23. MBT vs ENSILIN INT.

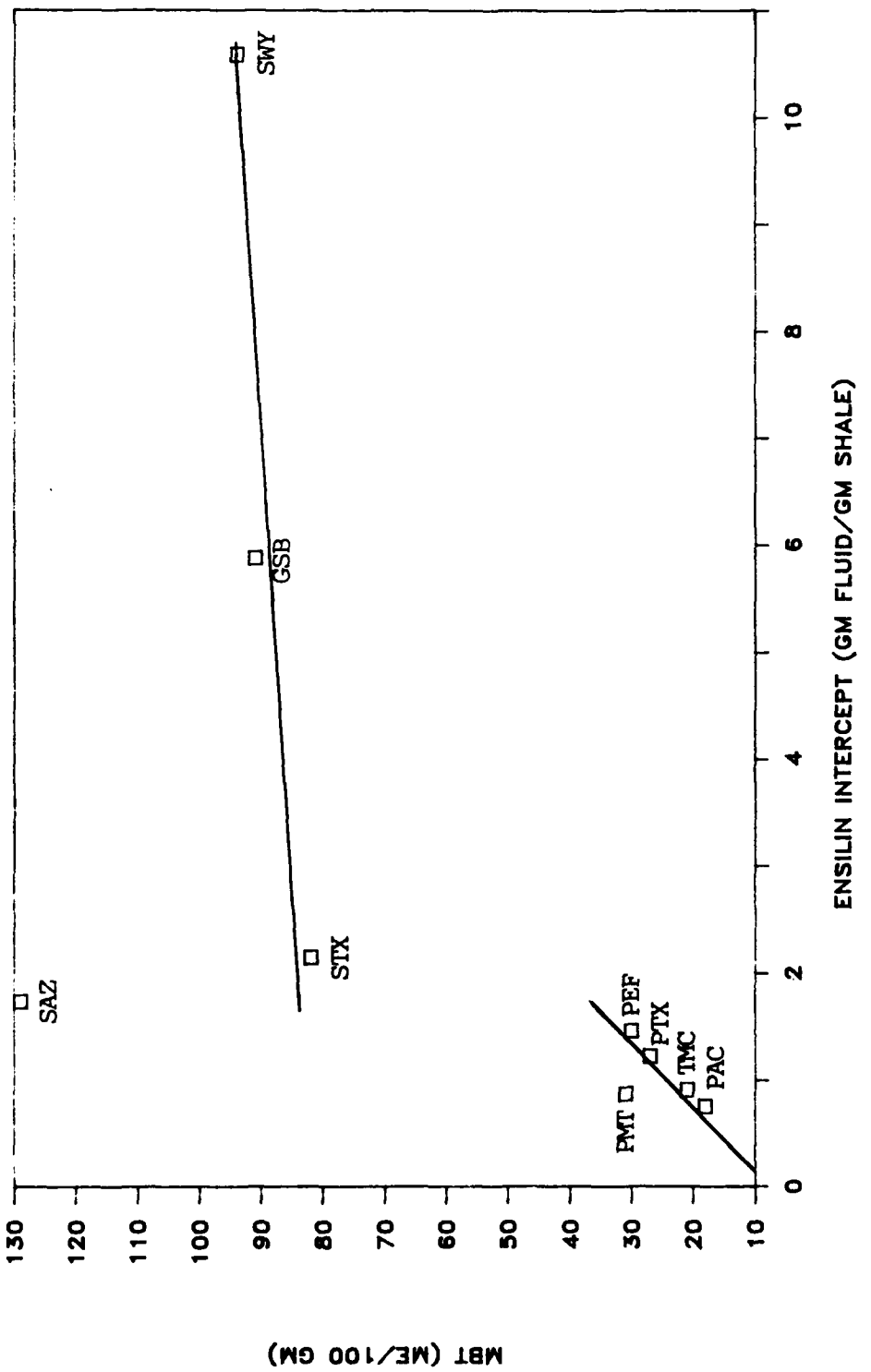
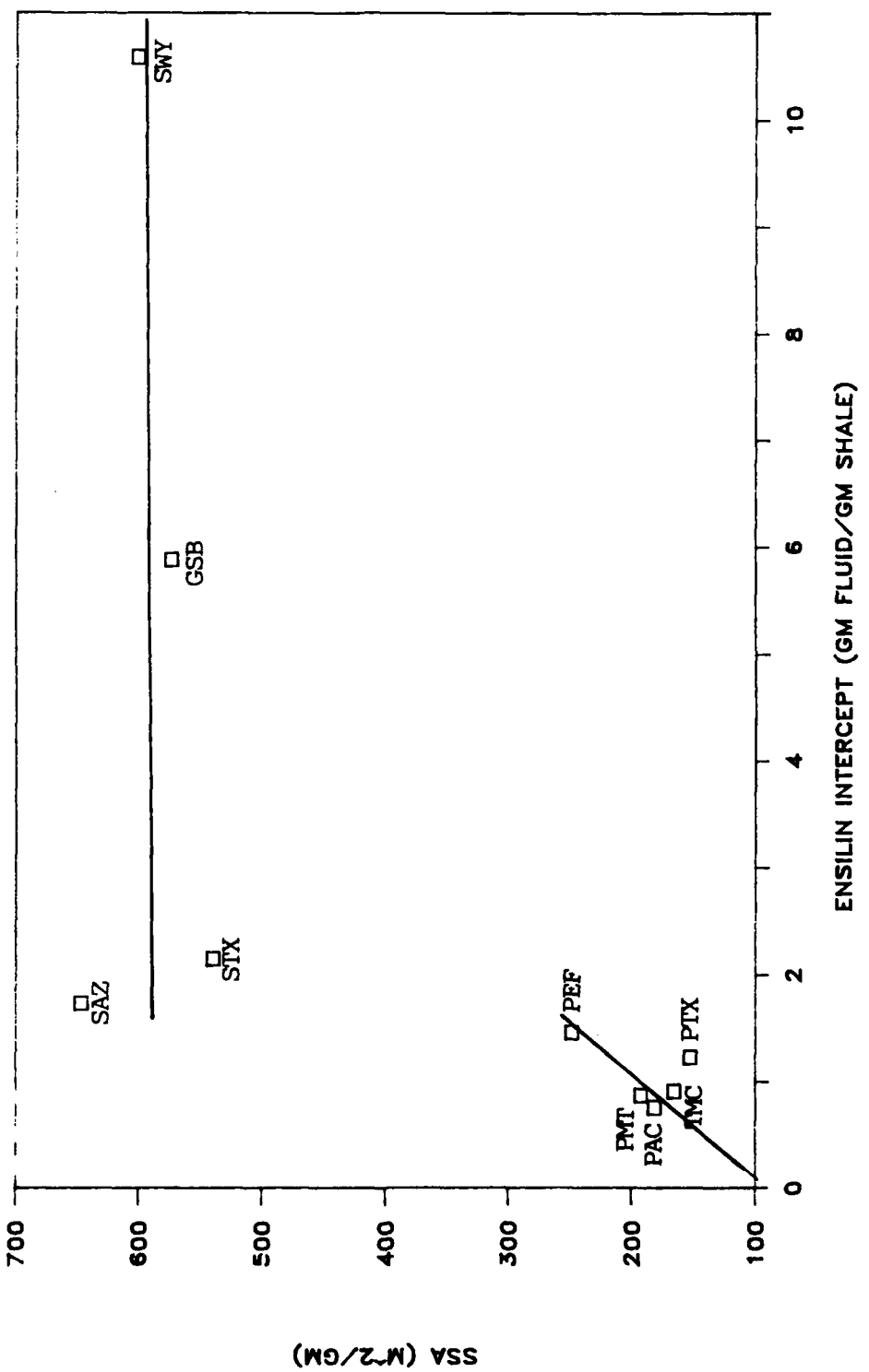


FIG. 24. SSA vs ENSILIN INT.



CHAPTER SEVEN
CONCLUSIONS

The Ensilin experiment is a good indication of the swelling potential of problem shales in a formation. It is also useful in determining whether a particular mud filtrate will effectively control the swelling in a formation. For these reasons and because it does not require much equipment, the Ensilin test is ideal for rig-site locations where the problems develop.

The results of this study show that the Ensilin apparatus is useful in relating fluid adsorption test results to shale classification schemes for problem shales. A general classification scheme for the shales tested can be developed from the Ensilin experiments. High swelling shales would have a swelling index value greater then 1.5 gm fluid/gm shale. Medium swelling shales would have a swelling index range from 1.0 to 1.5 gm fluid/gm shale. Medium low swelling shales would have a swelling index range from 0.75 to 1.0 gm fluid/gm shale. The final classification, low swelling shales, would have a swelling index value less then 0.75 gm fluid/gm shale.

This study also showed that potassium chloride acts as an inhibitor to swelling in certain types of clay minerals. Although potassium chloride in solution is some what effective in preventing swelling and dispersion problems in most clay minerals, it was most effective in preventing these problems in sodium montmorillonites.

Future work in this area of shale classification and stabilization

should include a broader classification scheme from as many different types of shale samples as possible. Also testing additional inhibitive mud systems would be helpful in determining the proper drilling fluid to use in each situation.

APPENDIX A
EXPERIMENTAL PROCEDURE

APPENDIX A
EXPERIMENTAL PROCEDURE

ENSILIN EQUIPMENT

1. Ensilin Apparatus. Figure 1 on page 13 shows the Ensilin apparatus. It consists of coarse glass fritted disk, glass tubing, a 100 ml reservoir, and two pipettes.

2. Pipettes. Two interchangeable pipettes. One with a 0.1 ml capacity (0.001 ml graduation) the other a 2.0 ml capacity (0.1 ml graduation).

3. Ball and hammer mill.

4. Ro-tap testing sieve shaker.

5. Tyler sieve sizes 10, 35, 100, and 200.

6. Balance (0.001 gm accuracy)

7. Glassware to prepare fluid samples.

8. Three (3) Thomas no. 12 clamps.

9. Drying oven for clay samples.

SAMPLE PREPARATION

1. Grind sample clay to small mesh size using ball and mill grinder.

2. Sieve the sample clay to pass through the U.S. Standard Sieve size 200 mesh. The Ro-tap testing sieve shaker and sieve sizes 10, 35, 100, and 200 were used.

3. Dry the sample clay in a 100 C drying oven overnight.

EXPERIMENTAL TECHNIQUE

1. Refer to Figure 1 for the testing apparatus. Attach 100 ml reservoir (Part

#3) to tubing apparatus (Part #2) with a No. 12 Thomas clamp. With valve B closed, fill the reservoir with approximately 100 ml of the test fluid and cover with plastic film.

2. Attach the desired pipette (Part #4) at point 3 with a No. 12 Thomas clamp.

Note a: Use the 2.0 ml pipette for medium-high swelling sample and the 0.1 ml pipette with low swelling sample.

Note b: The following procedure assumes a 2.0 ml pipette used.

3. Fill glass tubing and pipette with fluid (avoid air bubbles) by opening the 2-way (valve B) and 3-way (valve A) valves.

4. Cover glass frit (Part #1) with plastic film. Fill bottom of glass frit with fluid an attach to part #2 with a No. 12 Thomas clamp.

5. Using valves A and B, adjust the fluid volume in the pipette to 2.0 ml, and the fluid level to the bottom of the glass frit.

Note a: Valves are used to drain excess fluid from the apparatus to adjust the fluid to the proper level.

Note b: Valve A is left open and valve B is closed during the experiment. If the pipette needs recharging, close valve A and open valve B until proper fluid volume is obtained then close valve B and reopen valve A.

6. Open valve A and let apparatus come to equilibrium for 20 minutes.

7. If the fluid volume is not set at the 2.0 ml mark on the pipette, readjust the fluid volume to that mark with the valves.

8. Weigh sample and spread evenly over the glass frit, (Tap the frit lightly to ensure an even distribution).

Note: Use 0.5 gm of low swelling sample and 0.1 gm of high swelling sample.

9. Recover the glass frit with plastic film. Record the volume of fluid adsorbed by the sample as a function of time.

10. The experiment is completed when a plot of gm fluid/gm sample versus time on a linear scale approaches a straight line.

APPENDIX B
EXPERIMENTAL DATA

APPENDIX B
EXPERIMENTAL DATA

Tables 14 through 58 in this appendix give the experimental data for all the Ensilin experiments. The first two tables for each shale sample give the composite data for each apparatus. The three following tables, for each shale sample, give the comparison data for the two apparatus at the same fluid concentration. On these tables the regression analysis for the linear portion of the plot is also shown. Figures 25 through 51 show the comparison data for the two apparatus at the same fluid concentration.

TABLE 14. COMPOSITE ENSILIN TEST - GOLD SEAL BENTONITE - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.15	0.60	0.01	0.05	0.10	1.10
0.50	0.19	0.76	0.10	1.00	0.11	1.21
1.00	0.26	1.04	0.13	1.30	0.11	1.21
1.50	0.31	1.24	0.15	1.50	0.11	1.21
2.00	0.35	1.40	0.17	1.70	0.11	1.21
2.50	0.40	1.60	0.18	1.80	0.12	1.26
3.00	0.43	1.71	0.19	1.90	0.12	1.31
3.50	0.46	1.83	0.20	2.00	0.12	1.31
4.00	0.48	1.91	0.21	2.10	0.12	1.31
4.50	0.51	2.03	0.22	2.20	0.12	1.31
5.00	0.54	2.15	0.23	2.30	0.12	1.31
5.50	0.56	2.23	0.24	2.35	0.12	1.31
6.00	0.59	2.35	0.24	2.40	0.12	1.31
6.50	0.61	2.43	0.25	2.50	0.12	1.31
7.00	0.63	2.51	0.26	2.60	0.12	1.31
7.50	0.65	2.59	0.27	2.65	0.12	1.31
8.00	0.67	2.67	0.27	2.70	0.12	1.31
8.50	0.69	2.75	0.27	2.70	0.12	1.31
9.00	0.71	2.83	0.28	2.80	0.13	1.37
9.50	0.72	2.87	0.29	2.85	0.13	1.37
10.00	0.73	2.91	0.29	2.90	0.13	1.42
10.50	0.75	2.99	0.30	3.00	0.13	1.42
11.00	0.76	3.03	0.30	3.00	0.13	1.42
11.50	0.78	3.11	0.31	3.10	0.13	1.42
12.00	0.79	3.15	0.31	3.10	0.13	1.42
12.50	0.80	3.19	0.31	3.10	0.13	1.42
13.00	0.81	3.23	0.32	3.20	0.13	1.42
13.50	0.82	3.27	0.33	3.30	0.13	1.42
14.00	0.84	3.35	0.33	3.30	0.13	1.42
14.50	0.85	3.39	0.34	3.35	0.13	1.42
15.00	0.86	3.43	0.34	3.40	0.13	1.42
16.00	0.89	3.55	0.35	3.50	0.13	1.42
17.00	0.91	3.63	0.36	3.55	0.13	1.42
18.00	0.93	3.71	0.36	3.60	0.13	1.42
19.00	0.96	3.83	0.37	3.70	0.13	1.42
20.00	0.98	3.91	0.38	3.80	0.13	1.42
21.00	1.00	3.99	0.39	3.85	0.13	1.42
22.00	1.01	4.03	0.39	3.90	0.13	1.42
23.00	1.03	4.11	0.40	3.95	0.13	1.42
24.00	1.05	4.19	0.40	4.00	0.14	1.48
25.00	1.07	4.27	0.41	4.10	0.14	1.48
26.00	1.09	4.35	0.41	4.10	0.14	1.48
27.00	1.10	4.39	0.42	4.15	0.14	1.48
28.00	1.12	4.47	0.42	4.20	0.14	1.53
29.00	1.14	4.55	0.43	4.25	0.14	1.53
30.00	1.15	4.59	0.43	4.30	0.14	1.53
35.00	1.23	4.91	0.45	4.50		
40.00	1.30	5.18	0.46	4.60		
45.00	1.36	5.42	0.48	4.80		
50.00	1.41	5.62				
119.00	2.28	9.09				
120.00	2.29	9.13				
121.00	2.30	9.17				
123.00	2.31	9.21				
125.00	2.32	9.25				
130.00	2.36	9.41				
135.00	2.40	9.57				
140.00	2.43	9.69				
145.00	2.46	9.81				
150.00	2.50	9.97				
155.00	2.52	10.05				

TABLE 15. COMPOSITE ENSILIN TEST - GOLD SEAL BENTONITE - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.14	0.56	0.09	0.90	0.07	0.77
0.50	0.21	0.84	0.13	1.25	0.08	0.88
1.00	0.28	1.12	0.15	1.50	0.08	0.88
1.50	0.34	1.36	0.18	1.80	0.08	0.88
2.00	0.39	1.56	0.19	1.85	0.09	0.93
2.50	0.43	1.71	0.21	2.10	0.09	0.99
3.00	0.45	1.79	0.22	2.15	0.09	0.99
3.50	0.49	1.95	0.23	2.25	0.09	0.99
4.00	0.51	2.03	0.24	2.40	0.09	0.99
4.50	0.53	2.11	0.25	2.45	0.09	0.99
5.00	0.56	2.23	0.26	2.60	0.09	0.99
5.50	0.57	2.27	0.26	2.60	0.09	0.99
6.00	0.59	2.35	0.27	2.70	0.09	0.99
6.50	0.60	2.39	0.28	2.75	0.09	0.99
7.00	0.62	2.47	0.28	2.80	0.09	0.99
7.50	0.63	2.51	0.29	2.85	0.09	0.99
8.00	0.64	2.55	0.29	2.90	0.09	0.99
8.50	0.66	2.63	0.30	2.95	0.09	0.99
9.00	0.67	2.67	0.30	3.00	0.09	0.99
9.50	0.68	2.71	0.31	3.05	0.09	0.99
10.00	0.70	2.79	0.31	3.10	0.09	0.99
10.50	0.70	2.79	0.32	3.15	0.09	0.99
11.00	0.71	2.83	0.32	3.20	0.09	0.99
11.50	0.72	2.87	0.32	3.20	0.09	0.99
12.00	0.73	2.91	0.32	3.20	0.09	0.99
12.50	0.74	2.95	0.33	3.25	0.10	1.04
13.00	0.75	2.99	0.33	3.30	0.10	1.04
13.50	0.75	2.99	0.33	3.30	0.10	1.10
14.00	0.77	3.07	0.34	3.35	0.10	1.10
14.50	0.78	3.11	0.34	3.40	0.10	1.10
15.00	0.78	3.11	0.34	3.40	0.10	1.10
16.00	0.79	3.15	0.35	3.50	0.10	1.10
17.00	0.81	3.23	0.35	3.50	0.10	1.10
18.00	0.82	3.27	0.36	3.55	0.10	1.10
19.00	0.83	3.31	0.36	3.60	0.10	1.10
20.00	0.85	3.39	0.36	3.60	0.10	1.10
21.00	0.86	3.43	0.36	3.60	0.10	1.10
22.00	0.87	3.47	0.37	3.65	0.10	1.10
23.00	0.88	3.51	0.37	3.70	0.10	1.10
24.00	0.89	3.55	0.37	3.70	0.10	1.10
25.00	0.90	3.59	0.38	3.75	0.10	1.10
26.00	0.91	3.63	0.38	3.80	0.10	1.10
27.00	0.92	3.67	0.39	3.85	0.10	1.10
28.00	0.93	3.71	0.39	3.85	0.10	1.10
29.00	0.94	3.75	0.39	3.90	0.10	1.10
30.00	0.95	3.79	0.39	3.90	0.10	1.10
35.00	1.00	3.99	0.40	4.00		
40.00	1.04	4.15	0.41	4.05		
45.00	1.08	4.31	0.41	4.05		
50.00	1.12	4.47				
119.00	1.51	6.00				
120.00	1.51	6.02				
121.00	1.52	6.05				
123.00	1.53	6.08				
125.00	1.53	6.10				
130.00	1.55	6.18				
135.00	1.57	6.26				
140.00	1.59	6.34				
145.00	1.60	6.38				
150.00	1.62	6.46				
155.00	1.63	6.50				

TABLE 16. ENSILIN TEST - GOLD SEAL BENTONITE
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.15	0.60	0.25	0.14	0.56
0.50	0.19	0.76	0.50	0.21	0.84
1.00	0.26	1.04	1.00	0.28	1.12
1.50	0.31	1.24	1.50	0.34	1.36
2.00	0.35	1.40	2.00	0.39	1.56
2.50	0.40	1.60	2.50	0.43	1.71
3.00	0.43	1.71	3.00	0.45	1.79
3.50	0.46	1.83	3.50	0.49	1.95
4.00	0.48	1.91	4.00	0.51	2.03
4.50	0.51	2.03	4.50	0.53	2.11
5.00	0.54	2.15	5.00	0.56	2.23
5.50	0.56	2.23	5.50	0.57	2.27
6.00	0.59	2.35	6.00	0.59	2.35
6.50	0.61	2.43	6.50	0.60	2.39
7.00	0.63	2.51	7.00	0.62	2.47
7.50	0.65	2.59	7.50	0.63	2.51
8.00	0.67	2.67	8.00	0.64	2.55
8.50	0.69	2.75	8.50	0.66	2.63
9.00	0.71	2.83	9.00	0.67	2.67
9.50	0.72	2.87	9.50	0.68	2.71
10.00	0.73	2.91	10.00	0.70	2.79
10.50	0.75	2.99	10.50	0.70	2.79
11.00	0.76	3.03	11.00	0.71	2.83
11.50	0.78	3.11	11.50	0.72	2.87
12.00	0.79	3.15	12.00	0.73	2.91
12.50	0.80	3.19	12.50	0.74	2.95
13.00	0.81	3.23	13.00	0.75	2.99
13.50	0.82	3.27	13.50	0.75	2.99
14.00	0.84	3.35	14.00	0.77	3.07
14.50	0.85	3.39	14.50	0.78	3.11
15.00	0.86	3.43	15.00	0.78	3.11
16.00	0.89	3.55	16.00	0.79	3.15
17.00	0.91	3.63	17.00	0.81	3.23
18.00	0.93	3.71	18.00	0.82	3.27
19.00	0.96	3.83	19.00	0.83	3.31
20.00	0.98	3.91	20.00	0.85	3.39
21.00	1.00	3.99	21.00	0.86	3.43
22.00	1.01	4.03	22.00	0.87	3.47
23.00	1.03	4.11	23.00	0.88	3.51
24.00	1.05	4.19	24.00	0.89	3.55
25.00	1.07	4.27	25.00	0.90	3.59
26.00	1.09	4.35	26.00	0.91	3.63
27.00	1.10	4.39	27.00	0.92	3.67
28.00	1.12	4.47	28.00	0.93	3.71
29.00	1.14	4.55	29.00	0.94	3.75
30.00	1.15	4.59	30.00	0.95	3.79
35.00	1.23	4.91	35.00	1.00	3.99
40.00	1.30	5.18	40.00	1.04	4.15
45.00	1.36	5.42	45.00	1.08	4.31
50.00	1.41	5.62	50.00	1.12	4.47
119.00	2.28	9.09	119.00	1.51	6.00
120.00	2.29	9.13	120.00	1.51	6.02
121.00	2.30	9.17	121.00	1.52	6.05
123.00	2.31	9.21	123.00	1.53	6.08
125.00	2.32	9.25	125.00	1.53	6.10
130.00	2.36	9.41	130.00	1.55	6.18
135.00	2.40	9.57	135.00	1.57	6.26
140.00	2.43	9.69	140.00	1.59	6.34
145.00	2.46	9.81	145.00	1.60	6.38
150.00	2.50	9.97	150.00	1.62	6.46
155.00	2.52	10.05	155.00	1.63	6.50

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	5.879	Y-int (Gm H2O/Gm Clay)	4.348
Std Err of Y Est	0.020	Std Err of Y Est	0.016
R Squared	0.997	R Squared	0.993
No. of Observations	11.000	No. of Observations	11.000
Degrees of Freedom	9.000	Degrees of Freedom	9.000
Slope (Gm Fluid/Gm Clay Min)	0.027	Slope (Gm Fluid/Gm Clay Min)	0.014
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 17. ENSILIN TEST - GOLD SEAL BENTONITE
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.01	0.05	0.25	0.09	0.90
0.50	0.10	1.00	0.50	0.13	1.25
1.00	0.13	1.30	1.00	0.15	1.50
1.50	0.15	1.50	1.50	0.18	1.80
2.00	0.17	1.70	2.00	0.19	1.85
2.50	0.18	1.80	2.50	0.21	2.10
3.00	0.19	1.90	3.00	0.22	2.15
3.50	0.20	2.00	3.50	0.23	2.25
4.00	0.21	2.10	4.00	0.24	2.40
4.50	0.22	2.20	4.50	0.25	2.45
5.00	0.23	2.30	5.00	0.26	2.60
5.50	0.24	2.35	5.50	0.26	2.60
6.00	0.24	2.40	6.00	0.27	2.70
6.50	0.25	2.50	6.50	0.28	2.75
7.00	0.26	2.60	7.00	0.28	2.80
7.50	0.27	2.65	7.50	0.29	2.85
8.00	0.27	2.70	8.00	0.29	2.90
8.50	0.27	2.70	8.50	0.30	2.95
9.00	0.28	2.80	9.00	0.30	3.00
9.50	0.29	2.85	9.50	0.31	3.05
10.00	0.29	2.90	10.00	0.31	3.10
10.50	0.30	3.00	10.50	0.32	3.15
11.00	0.30	3.00	11.00	0.32	3.20
11.50	0.31	3.10	11.50	0.32	3.20
12.00	0.31	3.10	12.00	0.32	3.20
12.50	0.31	3.10	12.50	0.33	3.25
13.00	0.32	3.20	13.00	0.33	3.30
13.50	0.33	3.30	13.50	0.33	3.30
14.00	0.33	3.30	14.00	0.34	3.35
14.50	0.34	3.35	14.50	0.34	3.40
15.00	0.34	3.40	15.00	0.34	3.40
16.00	0.35	3.50	16.00	0.35	3.50
17.00	0.36	3.55	17.00	0.35	3.50
18.00	0.36	3.60	18.00	0.36	3.55
19.00	0.37	3.70	19.00	0.36	3.60
20.00	0.38	3.80	20.00	0.36	3.60
21.00	0.39	3.85	21.00	0.36	3.60
22.00	0.39	3.90	22.00	0.37	3.65
23.00	0.40	3.95	23.00	0.37	3.70
24.00	0.40	4.00	24.00	0.37	3.70
25.00	0.41	4.10	25.00	0.38	3.75
26.00	0.41	4.10	26.00	0.38	3.80
27.00	0.42	4.15	27.00	0.39	3.85
28.00	0.42	4.20	28.00	0.39	3.85
29.00	0.43	4.25	29.00	0.39	3.90
30.00	0.43	4.30	30.00	0.39	3.90
35.00	0.45	4.50	35.00	0.40	4.00
40.00	0.46	4.60	40.00	0.41	4.05
45.00	0.48	4.80	45.00	0.41	4.05

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	2.882	Y-int (Gm H2O/Gm Clay)	3.184
Std Err of Y Est	0.070	Std Err of Y Est	0.053
R Squared	0.964	R Squared	0.918
No. of Observations	18.000	No. of Observations	18.000
Degrees of Freedom	16.000	Degrees of Freedom	16.000
Slope (Gm Fluid/Gm Clay Min)	0.045	Slope (Gm Fluid/Gm Clay Min)	0.022
Std Err of Slope	0.002	Std Err of Slope	0.002

TABLE 18. ENSILIN TEST - GOLD SEAL BENTONITE
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.10	1.10	0.25	0.07	0.77
0.50	0.11	1.21	0.50	0.08	0.88
1.00	0.11	1.21	1.00	0.08	0.88
1.50	0.11	1.21	1.50	0.08	0.88
2.00	0.11	1.21	2.00	0.09	0.93
2.50	0.12	1.26	2.50	0.09	0.99
3.00	0.12	1.31	3.00	0.09	0.99
3.50	0.12	1.31	3.50	0.09	0.99
4.00	0.12	1.31	4.00	0.09	0.99
4.50	0.12	1.31	4.50	0.09	0.99
5.00	0.12	1.31	5.00	0.09	0.99
5.50	0.12	1.31	5.50	0.09	0.99
6.00	0.12	1.31	6.00	0.09	0.99
6.50	0.12	1.31	6.50	0.09	0.99
7.00	0.12	1.31	7.00	0.09	0.99
7.50	0.12	1.31	7.50	0.09	0.99
8.00	0.12	1.31	8.00	0.09	0.99
8.50	0.12	1.31	8.50	0.09	0.99
9.00	0.13	1.37	9.00	0.09	0.99
9.50	0.13	1.37	9.50	0.09	0.99
10.00	0.13	1.42	10.00	0.09	0.99
10.50	0.13	1.42	10.50	0.09	0.99
11.00	0.13	1.42	11.00	0.09	0.99
11.50	0.13	1.42	11.50	0.09	0.99
12.00	0.13	1.42	12.00	0.09	0.99
12.50	0.13	1.42	12.50	0.10	1.04
13.00	0.13	1.42	13.00	0.10	1.04
13.50	0.13	1.42	13.50	0.10	1.10
14.00	0.13	1.42	14.00	0.10	1.10
14.50	0.13	1.42	14.50	0.10	1.10
15.00	0.13	1.42	15.00	0.10	1.10
16.00	0.13	1.42	16.00	0.10	1.10
17.00	0.13	1.42	17.00	0.10	1.10
18.00	0.13	1.42	18.00	0.10	1.10
19.00	0.13	1.42	19.00	0.10	1.10
20.00	0.13	1.42	20.00	0.10	1.10
21.00	0.13	1.42	21.00	0.10	1.10
22.00	0.13	1.42	22.00	0.10	1.10
23.00	0.13	1.42	23.00	0.10	1.10
24.00	0.14	1.48	24.00	0.10	1.10
25.00	0.14	1.48	25.00	0.10	1.10
26.00	0.14	1.48	26.00	0.10	1.10
27.00	0.14	1.48	27.00	0.10	1.10
28.00	0.14	1.53	28.00	0.10	1.10
29.00	0.14	1.53	29.00	0.10	1.10
30.00	0.14	1.53	30.00	0.10	1.10

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.294	Y-int (Gm Fluid/Gm Clay)	0.955
Std Err of Y Est	0.030	Std Err of Y Est	0.030
R Squared	0.791	R Squared	0.692
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.008	Slope (Gm Fluid/Gm Clay Min)	0.006
Std Err of Slope	0.001	Std Err of Slope	0.001

TABLE 19. COMPOSITE ENSILIN TEST - PHILLIPS EKOFISK - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.53	1.06	0.53	1.06	0.38	0.83
0.50	0.56	1.12	0.54	1.08	0.40	0.88
1.00	0.66	1.32	0.62	1.24	0.41	0.90
1.50	0.69	1.38	0.63	1.25	0.42	0.92
2.00	0.71	1.42	0.63	1.26	0.42	0.92
2.50	0.72	1.44	0.63	1.26	0.43	0.94
3.00	0.73	1.46	0.64	1.27	0.43	0.94
3.50	0.73	1.46	0.64	1.28	0.44	0.96
4.00	0.74	1.48	0.64	1.28	0.44	0.96
4.50	0.74	1.48	0.64	1.28	0.44	0.96
5.00	0.75	1.50	0.64	1.28	0.45	0.99
5.50	0.75	1.50	0.65	1.30	0.45	0.99
6.00	0.75	1.50	0.65	1.30	0.45	0.99
6.50	0.76	1.52	0.65	1.30	0.45	0.99
7.00	0.76	1.52	0.65	1.30	0.45	0.99
7.50	0.76	1.52	0.66	1.32	0.46	1.01
8.00	0.77	1.54	0.66	1.32	0.46	1.01
8.50	0.77	1.54	0.66	1.32	0.46	1.01
9.00	0.77	1.54	0.66	1.32	0.46	1.01
9.50	0.77	1.54	0.66	1.32	0.46	1.01
10.00	0.77	1.54	0.66	1.32	0.47	1.03
10.50	0.78	1.56	0.66	1.32	0.47	1.03
11.00	0.78	1.56	0.67	1.34	0.47	1.03
11.50	0.78	1.56	0.67	1.34	0.47	1.03
12.00	0.79	1.58	0.67	1.34	0.47	1.03
12.50	0.79	1.58	0.67	1.34	0.47	1.03
13.00	0.79	1.58	0.67	1.34	0.48	1.05
13.50	0.79	1.58	0.67	1.34	0.48	1.05
14.00	0.79	1.58	0.67	1.34	0.48	1.05
14.50	0.80	1.60	0.67	1.34	0.48	1.05
15.00	0.80	1.60	0.67	1.34	0.48	1.05
16.00	0.80	1.60	0.68	1.35	0.48	1.05
17.00	0.81	1.62	0.68	1.36	0.48	1.05
18.00	0.81	1.62	0.68	1.36	0.48	1.05
19.00	0.82	1.64	0.68	1.36	0.49	1.07
20.00	0.82	1.64	0.68	1.36	0.49	1.07
21.00	0.83	1.66	0.69	1.37	0.49	1.07
22.00	0.83	1.66	0.69	1.37	0.50	1.10
23.00	0.84	1.68	0.69	1.38	0.50	1.10
24.00	0.84	1.68	0.69	1.38	0.50	1.10
25.00	0.85	1.70	0.69	1.38	0.50	1.10
26.00	0.85	1.70	0.69	1.38	0.50	1.10
27.00	0.86	1.71	0.70	1.40	0.51	1.12
28.00	0.86	1.71	0.70	1.40	0.51	1.12
29.00	0.86	1.71	0.70	1.40	0.51	1.12
30.00	0.87	1.73	0.70	1.40	0.51	1.12
35.00	0.89	1.77				
40.00	0.91	1.81				
45.00	0.94	1.87				

TABLE 20. COMPOSITE ENSILIN TEST - PHILLIPS
EKOFISK - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.52	1.04	0.50	1.00	0.34	0.75
0.50	0.56	1.12	0.54	1.08	0.34	0.75
1.00	0.61	1.22	0.56	1.12	0.34	0.75
1.50	0.61	1.22	0.57	1.14	0.34	0.75
2.00	0.62	1.24	0.58	1.16	0.35	0.77
2.50	0.62	1.24	0.58	1.16	0.35	0.77
3.00	0.63	1.26	0.59	1.18	0.35	0.77
3.50	0.63	1.26	0.59	1.18	0.36	0.79
4.00	0.64	1.28	0.59	1.18	0.36	0.79
4.50	0.64	1.28	0.60	1.20	0.36	0.79
5.00	0.64	1.28	0.60	1.20	0.36	0.79
5.50	0.64	1.28	0.60	1.20	0.37	0.81
6.00	0.65	1.30	0.60	1.20	0.37	0.81
6.50	0.65	1.30	0.60	1.20	0.37	0.81
7.00	0.65	1.30	0.60	1.20	0.38	0.83
7.50	0.65	1.30	0.60	1.20	0.38	0.83
8.00	0.66	1.32	0.60	1.20	0.38	0.83
8.50	0.66	1.32	0.60	1.20	0.38	0.83
9.00	0.66	1.32	0.60	1.20	0.39	0.85
9.50	0.66	1.32	0.60	1.20	0.39	0.85
10.00	0.66	1.32	0.60	1.20	0.39	0.85
10.50	0.66	1.32	0.60	1.20	0.39	0.85
11.00	0.66	1.32	0.60	1.20	0.39	0.85
11.50	0.67	1.34	0.60	1.20	0.39	0.85
12.00	0.67	1.34	0.60	1.20	0.39	0.85
12.50	0.67	1.34	0.60	1.20	0.40	0.88
13.00	0.67	1.34	0.60	1.20	0.40	0.88
13.50	0.67	1.34	0.60	1.20	0.40	0.88
14.00	0.67	1.34	0.60	1.20	0.40	0.88
14.50	0.67	1.34	0.60	1.20	0.40	0.88
15.00	0.67	1.34	0.60	1.20	0.40	0.88
16.00	0.68	1.36	0.60	1.20	0.40	0.88
17.00	0.68	1.36	0.60	1.20	0.40	0.88
18.00	0.68	1.36	0.60	1.20	0.40	0.88
19.00	0.68	1.36	0.60	1.20	0.40	0.88
20.00	0.68	1.36	0.60	1.20	0.40	0.88
21.00	0.69	1.38	0.60	1.20	0.40	0.88
22.00	0.69	1.38	0.60	1.20	0.40	0.88
23.00	0.69	1.38	0.60	1.20	0.40	0.88
24.00	0.69	1.38	0.60	1.20	0.41	0.90
25.00	0.69	1.38	0.60	1.20	0.41	0.90
26.00	0.69	1.38	0.60	1.20	0.41	0.90
27.00	0.69	1.38	0.60	1.20	0.41	0.90
28.00	0.69	1.38	0.60	1.20	0.41	0.90
29.00	0.70	1.40	0.60	1.20	0.41	0.90
30.00	0.70	1.40	0.60	1.20	0.41	0.90
35.00	0.70	1.40				
40.00	0.70	1.40				
45.00	0.71	1.42				

TABLE 21. ENSILIN TEST - PHILLIPS EKOFISK
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.53	1.06	0.25	0.52	1.04
0.50	0.56	1.12	0.50	0.56	1.12
1.00	0.66	1.32	1.00	0.61	1.22
1.50	0.69	1.38	1.50	0.61	1.22
2.00	0.71	1.42	2.00	0.62	1.24
2.50	0.72	1.44	2.50	0.62	1.24
3.00	0.73	1.46	3.00	0.63	1.26
3.50	0.73	1.46	3.50	0.63	1.26
4.00	0.74	1.48	4.00	0.64	1.28
4.50	0.74	1.48	4.50	0.64	1.28
5.00	0.75	1.50	5.00	0.64	1.28
5.50	0.75	1.50	5.50	0.64	1.28
6.00	0.75	1.50	6.00	0.65	1.30
6.50	0.76	1.52	6.50	0.65	1.30
7.00	0.76	1.52	7.00	0.65	1.30
7.50	0.76	1.52	7.50	0.65	1.30
8.00	0.77	1.54	8.00	0.66	1.32
8.50	0.77	1.54	8.50	0.66	1.32
9.00	0.77	1.54	9.00	0.66	1.32
9.50	0.77	1.54	9.50	0.66	1.32
10.00	0.77	1.54	10.00	0.66	1.32
10.50	0.78	1.56	10.50	0.66	1.32
11.00	0.78	1.56	11.00	0.66	1.32
11.50	0.78	1.56	11.50	0.67	1.34
12.00	0.79	1.58	12.00	0.67	1.34
12.50	0.79	1.58	12.50	0.67	1.34
13.00	0.79	1.58	13.00	0.67	1.34
13.50	0.79	1.58	13.50	0.67	1.34
14.00	0.79	1.58	14.00	0.67	1.34
14.50	0.80	1.60	14.50	0.67	1.34
15.00	0.80	1.60	15.00	0.67	1.34
16.00	0.80	1.60	16.00	0.68	1.36
17.00	0.81	1.62	17.00	0.68	1.36
18.00	0.81	1.62	18.00	0.68	1.36
19.00	0.82	1.64	19.00	0.68	1.36
20.00	0.82	1.64	20.00	0.68	1.36
21.00	0.83	1.66	21.00	0.69	1.38
22.00	0.83	1.66	22.00	0.69	1.38
23.00	0.84	1.68	23.00	0.69	1.38
24.00	0.84	1.68	24.00	0.69	1.38
25.00	0.85	1.70	25.00	0.69	1.38
26.00	0.85	1.70	26.00	0.69	1.38
27.00	0.86	1.71	27.00	0.69	1.38
28.00	0.86	1.71	28.00	0.69	1.38
29.00	0.86	1.71	29.00	0.70	1.40
30.00	0.87	1.73	30.00	0.70	1.40
35.00	0.89	1.77	35.00	0.70	1.40
40.00	0.91	1.81	40.00	0.70	1.40
45.00	0.94	1.87	45.00	0.71	1.42

Regression Output:

Y-int (Gm Fluid/Gm Clay)	1.455
Std Err of Y Est	0.006
R Squared	0.994
No. of Observations	29.000
Degrees of Freedom	27.000
Slope (Gm Fluid/Gm Clay Min)	0.009
Std Err of Slope	0.000

Regression Output:

Y-int (Gm H2O/Gm Clay)	1.301
Std Err of Y Est	0.009
R Squared	0.889
No. of Observations	29.000
Degrees of Freedom	27.000
Slope (Gm Fluid/Gm Clay Min)	0.003
Std Err of Slope	0.000

TABLE 22. ENSILIN TEST - PHILLIPS EKOFISK
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.53	1.06	0.25	0.50	1.00
0.50	0.54	1.08	0.50	0.54	1.08
1.00	0.62	1.24	1.00	0.56	1.12
1.50	0.63	1.25	1.50	0.57	1.14
2.00	0.63	1.26	2.00	0.58	1.16
2.50	0.63	1.26	2.50	0.58	1.16
3.00	0.64	1.27	3.00	0.59	1.18
3.50	0.64	1.28	3.50	0.59	1.18
4.00	0.64	1.28	4.00	0.59	1.18
4.50	0.64	1.28	4.50	0.60	1.20
5.00	0.64	1.28	5.00	0.60	1.20
5.50	0.65	1.30	5.50	0.60	1.20
6.00	0.65	1.30	6.00	0.60	1.20
6.50	0.65	1.30	6.50	0.60	1.20
7.00	0.65	1.30	7.00	0.60	1.20
7.50	0.66	1.32	7.50	0.60	1.20
8.00	0.66	1.32	8.00	0.60	1.20
8.50	0.66	1.32	8.50	0.60	1.20
9.00	0.66	1.32	9.00	0.60	1.20
9.50	0.66	1.32	9.50	0.60	1.20
10.00	0.66	1.32	10.00	0.60	1.20
10.50	0.66	1.32	10.50	0.60	1.20
11.00	0.67	1.34	11.00	0.60	1.20
11.50	0.67	1.34	11.50	0.60	1.20
12.00	0.67	1.34	12.00	0.60	1.20
12.50	0.67	1.34	12.50	0.60	1.20
13.00	0.67	1.34	13.00	0.60	1.20
13.50	0.67	1.34	13.50	0.60	1.20
14.00	0.67	1.34	14.00	0.60	1.20
14.50	0.67	1.34	14.50	0.60	1.20
15.00	0.67	1.34	15.00	0.60	1.20
16.00	0.68	1.35	16.00	0.60	1.20
17.00	0.68	1.36	17.00	0.60	1.20
18.00	0.68	1.36	18.00	0.60	1.20
19.00	0.68	1.36	19.00	0.60	1.20
20.00	0.68	1.36	20.00	0.60	1.20
21.00	0.69	1.37	21.00	0.60	1.20
22.00	0.69	1.37	22.00	0.60	1.20
23.00	0.69	1.38	23.00	0.60	1.20
24.00	0.69	1.38	24.00	0.60	1.20
25.00	0.69	1.38	25.00	0.60	1.20
26.00	0.69	1.38	26.00	0.60	1.20
27.00	0.70	1.40	27.00	0.60	1.20
28.00	0.70	1.40	28.00	0.60	1.20
29.00	0.70	1.40	29.00	0.60	1.20
30.00	0.70	1.40	30.00	0.60	1.20

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.281	Y-int (Gm H2O/Gm Clay)	1.200
Std Err of Y Est	0.007	Std Err of Y Est	0.000
R Squared	0.955	R Squared	0.000
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope		Slope	
(Gm Fluid/Gm Clay Min)	0.004	(Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 23. ENSILIN TEST - PHILLIPS EKOFISK
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.38	0.83	0.25	0.34	0.75
0.50	0.40	0.88	0.50	0.34	0.75
1.00	0.41	0.90	1.00	0.34	0.75
1.50	0.42	0.92	1.50	0.34	0.75
2.00	0.42	0.92	2.00	0.35	0.77
2.50	0.43	0.94	2.50	0.35	0.77
3.00	0.43	0.94	3.00	0.35	0.77
3.50	0.44	0.96	3.50	0.36	0.79
4.00	0.44	0.96	4.00	0.36	0.79
4.50	0.44	0.96	4.50	0.36	0.79
5.00	0.45	0.99	5.00	0.36	0.79
5.50	0.45	0.99	5.50	0.37	0.81
6.00	0.45	0.99	6.00	0.37	0.81
6.50	0.45	0.99	6.50	0.37	0.81
7.00	0.45	0.99	7.00	0.38	0.83
7.50	0.46	1.01	7.50	0.38	0.83
8.00	0.46	1.01	8.00	0.38	0.83
8.50	0.46	1.01	8.50	0.38	0.83
9.00	0.46	1.01	9.00	0.39	0.85
9.50	0.46	1.01	9.50	0.39	0.85
10.00	0.47	1.03	10.00	0.39	0.85
10.50	0.47	1.03	10.50	0.39	0.85
11.00	0.47	1.03	11.00	0.39	0.85
11.50	0.47	1.03	11.50	0.39	0.85
12.00	0.47	1.03	12.00	0.39	0.85
12.50	0.47	1.03	12.50	0.40	0.88
13.00	0.48	1.05	13.00	0.40	0.88
13.50	0.48	1.05	13.50	0.40	0.88
14.00	0.48	1.05	14.00	0.40	0.88
14.50	0.48	1.05	14.50	0.40	0.88
15.00	0.48	1.05	15.00	0.40	0.88
16.00	0.48	1.05	16.00	0.40	0.88
17.00	0.48	1.05	17.00	0.40	0.88
18.00	0.48	1.05	18.00	0.40	0.88
19.00	0.49	1.07	19.00	0.40	0.88
20.00	0.49	1.07	20.00	0.40	0.88
21.00	0.49	1.07	21.00	0.40	0.88
22.00	0.50	1.10	22.00	0.40	0.88
23.00	0.50	1.10	23.00	0.40	0.88
24.00	0.50	1.10	24.00	0.41	0.90
25.00	0.50	1.10	25.00	0.41	0.90
26.00	0.50	1.10	26.00	0.41	0.90
27.00	0.51	1.12	27.00	0.41	0.90
28.00	0.51	1.12	28.00	0.41	0.90
29.00	0.51	1.12	29.00	0.41	0.90
30.00	0.51	1.12	30.00	0.41	0.90

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.978	Y-int (Gm H2O/Gm Clay)	0.839
Std Err of Y Est	0.007	Std Err of Y Est	0.007
R Squared	0.956	R Squared	0.787
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope		Slope	
(Gm Fluid/Gm Clay Min)	0.005	(Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 24. COMPOSITE ENSILIN TEST - PHILLIPS
ANDREWS COUNTY - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.32	0.64	0.36	0.72	0.30	0.66
0.50	0.36	0.72	0.38	0.76	0.31	0.68
1.00	0.37	0.74	0.42	0.83	0.31	0.68
1.50	0.39	0.78	0.43	0.86	0.32	0.70
2.00	0.39	0.78	0.43	0.86	0.32	0.70
2.50	0.40	0.80	0.43	0.86	0.32	0.70
3.00	0.40	0.80	0.44	0.87	0.32	0.70
3.50	0.40	0.80	0.44	0.88	0.32	0.70
4.00	0.41	0.82	0.44	0.88	0.32	0.70
4.50	0.41	0.82	0.44	0.88	0.33	0.72
5.00	0.41	0.82	0.45	0.89	0.33	0.72
5.50	0.42	0.83	0.45	0.90	0.33	0.72
6.00	0.42	0.84	0.45	0.90	0.33	0.72
6.50	0.42	0.84	0.45	0.90	0.33	0.72
7.00	0.42	0.84	0.45	0.90	0.33	0.72
7.50	0.43	0.86	0.45	0.90	0.33	0.72
8.00	0.43	0.86	0.45	0.90	0.33	0.72
8.50	0.43	0.86	0.45	0.90	0.33	0.72
9.00	0.44	0.88	0.45	0.90	0.33	0.72
9.50	0.44	0.88	0.45	0.90	0.34	0.75
10.00	0.44	0.88	0.46	0.92	0.34	0.75
11.00	0.45	0.90	0.46	0.92	0.34	0.75
12.00	0.45	0.90	0.47	0.94	0.34	0.75
13.00	0.46	0.92	0.47	0.94	0.35	0.77
14.00	0.46	0.92	0.47	0.94	0.35	0.77
15.00	0.47	0.94	0.47	0.94	0.35	0.77
16.00	0.47	0.94	0.47	0.94	0.35	0.77
17.00	0.48	0.96	0.48	0.95	0.35	0.77
18.00	0.48	0.96	0.48	0.95	0.35	0.77
19.00	0.49	0.98	0.48	0.96	0.35	0.77
20.00	0.49	0.98	0.48	0.96	0.36	0.79
21.00	0.50	1.00	0.48	0.96	0.36	0.79
22.00	0.50	1.00	0.48	0.96	0.36	0.79
23.00	0.50	1.00	0.48	0.96	0.36	0.79
24.00	0.50	1.00	0.49	0.97	0.36	0.79
25.00	0.51	1.02	0.49	0.98	0.36	0.79
26.00			0.49	0.98	0.37	0.81
27.00			0.49	0.98	0.37	0.81
28.00			0.50	1.00	0.37	0.81
29.00			0.50	1.00	0.37	0.81
30.00			0.50	1.00	0.37	0.81

TABLE 25. COMPOSITE ENSILIN TEST - PHILLIPS
ANDREWS COUNTY - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.000	0.00	0.00	0.00	0.00	0.00
0.25	0.064	0.64	0.20	0.40	0.28	0.61
0.50	0.066	0.66	0.28	0.56	0.32	0.70
1.00	0.067	0.67	0.28	0.56	0.32	0.70
1.50	0.068	0.68	0.36	0.72	0.32	0.70
2.00	0.069	0.69	0.38	0.76	0.33	0.72
2.50	0.070	0.70	0.38	0.76	0.33	0.72
3.00	0.071	0.70	0.38	0.76	0.33	0.72
3.50	0.071	0.71	0.38	0.76	0.33	0.72
4.00	0.071	0.71	0.39	0.78	0.33	0.72
4.50	0.072	0.71	0.39	0.78	0.33	0.72
5.00	0.072	0.72	0.39	0.78	0.33	0.72
5.50	0.072	0.72	0.39	0.78	0.33	0.72
6.00	0.072	0.72	0.39	0.78	0.33	0.72
6.50	0.073	0.72	0.39	0.78	0.33	0.72
7.00	0.073	0.73	0.39	0.78	0.33	0.72
7.50	0.073	0.73	0.40	0.80	0.33	0.72
8.00	0.074	0.73	0.40	0.80	0.33	0.72
8.50	0.074	0.74	0.40	0.80	0.34	0.75
9.00	0.074	0.74	0.40	0.80	0.34	0.75
9.50	0.074	0.74	0.40	0.80	0.34	0.75
10.00	0.075	0.75	0.40	0.80	0.34	0.75
11.00	0.075	0.75	0.40	0.80	0.34	0.75
12.00	0.076	0.76	0.40	0.80	0.34	0.75
13.00	0.076	0.76	0.40	0.80	0.34	0.75
14.00	0.077	0.77	0.40	0.80	0.34	0.75
15.00	0.078	0.78	0.40	0.80	0.34	0.75
16.00	0.078	0.78	0.40	0.80	0.34	0.75
17.00	0.078	0.78	0.40	0.80	0.34	0.75
18.00	0.079	0.79	0.40	0.80	0.34	0.75
19.00	0.079	0.79	0.40	0.80	0.34	0.75
20.00	0.080	0.80	0.40	0.80	0.34	0.75
21.00	0.080	0.80	0.40	0.80	0.34	0.75
22.00	0.080	0.80	0.40	0.80	0.35	0.77
23.00	0.081	0.81	0.40	0.80	0.35	0.77
24.00	0.081	0.81	0.40	0.80	0.35	0.77
25.00	0.082	0.82	0.40	0.80	0.35	0.77
26.00			0.40	0.80	0.35	0.77
27.00			0.40	0.80	0.35	0.77
28.00			0.40	0.80	0.35	0.77
29.00			0.40	0.80	0.35	0.77
30.00			0.40	0.80	0.35	0.77

TABLE 26. ENSILIN TEST - PHILLIPS ANDREWS
COUNTY 0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.000	0.00
0.25	0.32	0.64	0.25	0.064	0.64
0.50	0.36	0.72	0.50	0.066	0.66
0.75	0.37	0.74	0.75	0.067	0.67
1.00	0.37	0.74	1.00	0.067	0.67
1.25	0.37	0.74	1.25	0.068	0.67
1.50	0.39	0.78	1.50	0.068	0.68
1.75	0.39	0.78	1.75	0.068	0.68
2.00	0.39	0.78	2.00	0.069	0.69
2.25	0.39	0.78	2.25	0.069	0.69
2.50	0.40	0.80	2.50	0.070	0.70
2.75	0.40	0.80	2.75	0.070	0.70
3.00	0.40	0.80	3.00	0.071	0.70
3.25	0.40	0.80	3.25	0.071	0.71
3.50	0.40	0.80	3.50	0.071	0.71
3.75	0.40	0.80	3.75	0.071	0.71
4.00	0.41	0.82	4.00	0.071	0.71
4.25	0.41	0.82	4.25	0.072	0.71
4.50	0.41	0.82	4.50	0.072	0.71
4.75	0.41	0.82	4.75	0.072	0.72
5.00	0.41	0.82	5.00	0.072	0.72
5.25	0.41	0.82	5.25	0.072	0.72
5.50	0.42	0.83	5.50	0.072	0.72
5.75	0.42	0.84	5.75	0.072	0.72
6.00	0.42	0.84	6.00	0.072	0.72
6.25	0.42	0.84	6.25	0.073	0.72
6.50	0.42	0.84	6.50	0.073	0.72
6.75	0.42	0.84	6.75	0.073	0.73
7.00	0.42	0.84	7.00	0.073	0.73
7.25	0.43	0.86	7.25	0.073	0.73
7.50	0.43	0.86	7.50	0.073	0.73
7.75	0.43	0.86	7.75	0.074	0.73
8.00	0.43	0.86	8.00	0.074	0.73
8.25	0.43	0.86	8.25	0.074	0.74
8.50	0.43	0.86	8.50	0.074	0.74
8.75	0.43	0.86	8.75	0.074	0.74
9.00	0.44	0.88	9.00	0.074	0.74
9.25	0.44	0.88	9.25	0.074	0.74
9.50	0.44	0.88	9.50	0.074	0.74
9.75	0.44	0.88	9.75	0.075	0.74
10.00	0.44	0.88	10.00	0.075	0.74
10.50	0.44	0.88	10.50	0.075	0.75
11.00	0.45	0.90	11.00	0.075	0.75
11.50	0.45	0.90	11.50	0.076	0.75
12.00	0.45	0.90	12.00	0.076	0.76
12.50	0.45	0.90	12.50	0.076	0.76
13.00	0.46	0.92	13.00	0.076	0.76
13.50	0.46	0.92	13.50	0.077	0.76
14.00	0.46	0.92	14.00	0.077	0.77
14.50	0.46	0.92	14.50	0.078	0.78
15.00	0.47	0.94	15.00	0.078	0.78
16.00	0.47	0.94	16.00	0.078	0.78
17.00	0.48	0.96	17.00	0.078	0.78
18.00	0.48	0.96	18.00	0.079	0.79
19.00	0.49	0.98	19.00	0.079	0.79
20.00	0.49	0.98	20.00	0.080	0.80
21.00	0.50	1.00	21.00	0.080	0.80
22.00	0.50	1.00	22.00	0.080	0.80
23.00	0.50	1.00	23.00	0.081	0.81
24.00	0.50	1.00	24.00	0.081	0.81
25.00	0.51	1.02	25.00	0.082	0.82

Regression Output:

Y-int (Gm Fl[illegible] Gm Clay)	0.755
Std Err of Y Est	0.021
R Squared	0.928
No. of Observations	60.000
Degrees of Freedom	58.000
Slope (Gm Fluid/Gm Clay Min)	0.012
Std Err of Slope	0.000

Regression Output:

Y-int (Gm H2O/Gm Clay)	0.680
Std Err of Y Est	0.010
R Squared	0.940
No. of Observations	60.000
Degrees of Freedom	58.000
Slope (Gm Fluid/Gm Clay Min)	0.006
Std Err of Slope	0.000

TABLE 27. ENSILIN TEST - PHILLIPS ANDREWS
COUNTY 0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.36	0.72	0.25	0.20	0.40
0.50	0.38	0.76	0.50	0.28	0.56
1.00	0.42	0.83	1.00	0.28	0.56
1.50	0.43	0.86	1.50	0.36	0.72
2.00	0.43	0.86	2.00	0.38	0.76
2.50	0.43	0.86	2.50	0.38	0.76
3.00	0.44	0.87	3.00	0.38	0.76
3.50	0.44	0.88	3.50	0.38	0.76
4.00	0.44	0.88	4.00	0.39	0.78
4.50	0.44	0.88	4.50	0.39	0.78
5.00	0.45	0.89	5.00	0.39	0.78
5.50	0.45	0.90	5.50	0.39	0.78
6.00	0.45	0.90	6.00	0.39	0.78
6.50	0.45	0.90	6.50	0.39	0.78
7.00	0.45	0.90	7.00	0.39	0.78
7.50	0.45	0.90	7.50	0.40	0.80
8.00	0.45	0.90	8.00	0.40	0.80
8.50	0.45	0.90	8.50	0.40	0.80
9.00	0.45	0.90	9.00	0.40	0.80
9.50	0.45	0.90	9.50	0.40	0.80
10.00	0.46	0.92	10.00	0.40	0.80
10.50	0.46	0.92	10.50	0.40	0.80
11.00	0.46	0.92	11.00	0.40	0.80
11.50	0.46	0.92	11.50	0.40	0.80
12.00	0.47	0.94	12.00	0.40	0.80
12.50	0.47	0.94	12.50	0.40	0.80
13.00	0.47	0.94	13.00	0.40	0.80
13.50	0.47	0.94	13.50	0.40	0.80
14.00	0.47	0.94	14.00	0.40	0.80
14.50	0.47	0.94	14.50	0.40	0.80
15.00	0.47	0.94	15.00	0.40	0.80
16.00	0.47	0.94	16.00	0.40	0.80
17.00	0.48	0.95	17.00	0.40	0.80
18.00	0.48	0.95	18.00	0.40	0.80
19.00	0.48	0.96	19.00	0.40	0.80
20.00	0.48	0.96	20.00	0.40	0.80
21.00	0.48	0.96	21.00	0.40	0.80
22.00	0.48	0.96	22.00	0.40	0.80
23.00	0.48	0.96	23.00	0.40	0.80
24.00	0.49	0.97	24.00	0.40	0.80
25.00	0.49	0.98	25.00	0.40	0.80
26.00	0.49	0.98	26.00	0.40	0.80
27.00	0.49	0.98	27.00	0.40	0.80
28.00	0.50	1.00	28.00	0.40	0.80
29.00	0.50	1.00	29.00	0.40	0.80
30.00	0.50	1.00	30.00	0.40	0.80

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.885	Y-int (Gm H2O/Gm Clay)	0.800
Std Err of Y Est	0.006	Std Err of Y Est	0.000
R Squared	0.945	R Squared	0.000
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.004	Slope (Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 28. ENSILIN TEST - PHILLIPS ANDREWS COUNTY 15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.30	0.66	0.25	0.28	0.61
0.50	0.31	0.68	0.50	0.32	0.70
1.00	0.31	0.68	1.00	0.32	0.70
1.50	0.32	0.70	1.50	0.32	0.70
2.00	0.32	0.70	2.00	0.33	0.72
2.50	0.32	0.70	2.50	0.33	0.72
3.00	0.32	0.70	3.00	0.33	0.72
3.50	0.32	0.70	3.50	0.33	0.72
4.00	0.32	0.70	4.00	0.33	0.72
4.50	0.33	0.72	4.50	0.33	0.72
5.00	0.33	0.72	5.00	0.33	0.72
5.50	0.33	0.72	5.50	0.33	0.72
6.00	0.33	0.72	6.00	0.33	0.72
6.50	0.33	0.72	6.50	0.33	0.72
7.00	0.33	0.72	7.00	0.33	0.72
7.50	0.33	0.72	7.50	0.33	0.72
8.00	0.33	0.72	8.00	0.33	0.72
8.50	0.33	0.72	8.50	0.34	0.75
9.00	0.33	0.72	9.00	0.34	0.75
9.50	0.34	0.75	9.50	0.34	0.75
10.00	0.34	0.75	10.00	0.34	0.75
11.00	0.34	0.75	11.00	0.34	0.75
12.00	0.34	0.75	12.00	0.34	0.75
13.00	0.35	0.77	13.00	0.34	0.75
14.00	0.35	0.77	14.00	0.34	0.75
15.00	0.35	0.77	15.00	0.34	0.75
16.00	0.35	0.77	16.00	0.34	0.75
17.00	0.35	0.77	17.00	0.34	0.75
18.00	0.35	0.77	18.00	0.34	0.75
19.00	0.35	0.77	19.00	0.34	0.75
20.00	0.36	0.79	20.00	0.34	0.75
21.00	0.36	0.79	21.00	0.34	0.75
22.00	0.36	0.79	22.00	0.35	0.77
23.00	0.36	0.79	23.00	0.35	0.77
24.00	0.36	0.79	24.00	0.35	0.77
25.00	0.36	0.79	25.00	0.35	0.77
26.00	0.37	0.81	26.00	0.35	0.77
27.00	0.37	0.81	27.00	0.35	0.77
28.00	0.37	0.81	28.00	0.35	0.77
29.00	0.37	0.81	29.00	0.35	0.77
30.00	0.37	0.81	30.00	0.35	0.77

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.700	Y-int (Gm H2O/Gm Clay)	0.718
Std Err of Y Est	0.007	Std Err of Y Est	0.007
R Squared	0.953	R Squared	0.818
No. of Observations	31.000	No. of Observations	31.000
Degrees of Freedom	29.000	Degrees of Freedom	29.000
Slope (Gm Fluid/Gm Clay Min)	0.004	Slope (Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 29. COMPOSITE ENSILIN TEST - TEXACO
MISSISSIPPI CANYON - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.36	0.72	0.35	0.70	0.24	0.53
0.50	0.41	0.82	0.37	0.74	0.25	0.55
1.00	0.43	0.86	0.39	0.78	0.26	0.57
1.50	0.44	0.88	0.39	0.78	0.27	0.59
2.00	0.45	0.90	0.39	0.78	0.27	0.59
2.50	0.46	0.92	0.39	0.78	0.28	0.61
3.00	0.46	0.92	0.40	0.80	0.28	0.61
3.50	0.47	0.94	0.40	0.80	0.29	0.64
4.00	0.47	0.94	0.40	0.80	0.29	0.64
4.50	0.48	0.96	0.40	0.80	0.29	0.64
5.00	0.48	0.96	0.40	0.80	0.29	0.64
5.50	0.48	0.96	0.41	0.81	0.30	0.66
6.00	0.49	0.98	0.41	0.81	0.30	0.66
6.50	0.49	0.98	0.41	0.81	0.30	0.66
7.00	0.50	1.00	0.41	0.81	0.30	0.66
7.50	0.50	1.00	0.41	0.81	0.30	0.66
8.00	0.51	1.02	0.41	0.81	0.30	0.66
8.50	0.51	1.02	0.41	0.82	0.30	0.66
9.00	0.51	1.02	0.41	0.82	0.30	0.66
9.50	0.51	1.02	0.41	0.82	0.30	0.66
10.00	0.51	1.02	0.41	0.82	0.30	0.66
10.50	0.52	1.04	0.41	0.82	0.30	0.66
11.00	0.52	1.04	0.41	0.82	0.30	0.66
11.50	0.52	1.04	0.41	0.82	0.30	0.66
12.00	0.53	1.06	0.42	0.83	0.30	0.66
12.50	0.53	1.06	0.42	0.83	0.30	0.66
13.00	0.53	1.06	0.42	0.84	0.31	0.68
13.50	0.53	1.06	0.42	0.84	0.31	0.68
14.00	0.54	1.08	0.42	0.84	0.31	0.68
14.50	0.54	1.08	0.42	0.84	0.31	0.68
15.00	0.54	1.08	0.42	0.84	0.31	0.68
16.00	0.55	1.10	0.42	0.84	0.31	0.68
17.00	0.56	1.12	0.42	0.84	0.31	0.68
18.00	0.56	1.12	0.42	0.84	0.31	0.68
19.00	0.56	1.12	0.42	0.84	0.31	0.68
20.00	0.57	1.14	0.43	0.85	0.31	0.68
21.00	0.57	1.14	0.43	0.85	0.32	0.70
22.00	0.58	1.16	0.43	0.86	0.32	0.70
23.00	0.59	1.18	0.43	0.86	0.32	0.70
24.00	0.59	1.18	0.43	0.86	0.32	0.70
25.00	0.59	1.18	0.43	0.86	0.32	0.70
26.00			0.43	0.86	0.32	0.70
27.00			0.43	0.86	0.32	0.70
28.00			0.43	0.86	0.32	0.70
29.00			0.43	0.86	0.32	0.70
30.00			0.43	0.86	0.32	0.70

TABLE 30. COMPOSITE ENSILIN TEST - TEXACO
MISSISSIPPI CANYON - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.31	0.62	0.33	0.66	0.20	0.44
0.50	0.33	0.66	0.35	0.70	0.20	0.44
1.00	0.38	0.76	0.37	0.74	0.21	0.46
1.50	0.39	0.78	0.37	0.74	0.22	0.47
2.00	0.40	0.80	0.38	0.76	0.22	0.48
2.50	0.41	0.82	0.38	0.76	0.22	0.48
3.00	0.41	0.82	0.38	0.76	0.22	0.48
3.50	0.42	0.84	0.39	0.77	0.22	0.48
4.00	0.42	0.84	0.39	0.78	0.23	0.50
4.50	0.42	0.84	0.39	0.78	0.23	0.50
5.00	0.43	0.86	0.39	0.78	0.23	0.50
5.50	0.43	0.86	0.39	0.78	0.23	0.50
6.00	0.43	0.86	0.39	0.78	0.23	0.50
6.50	0.44	0.88	0.39	0.78	0.23	0.50
7.00	0.44	0.88	0.40	0.79	0.23	0.50
7.50	0.44	0.88	0.40	0.79	0.23	0.50
8.00	0.45	0.90	0.40	0.79	0.24	0.53
8.50	0.45	0.90	0.40	0.79	0.24	0.53
9.00	0.45	0.90	0.40	0.80	0.24	0.53
9.50	0.45	0.90	0.40	0.80	0.24	0.53
10.00	0.45	0.90	0.40	0.80	0.24	0.53
10.50	0.45	0.90	0.40	0.80	0.24	0.53
11.00	0.45	0.90	0.40	0.80	0.24	0.53
11.50	0.45	0.90	0.40	0.80	0.24	0.53
12.00	0.46	0.92	0.40	0.80	0.24	0.53
12.50	0.46	0.92	0.40	0.80	0.24	0.53
13.00	0.46	0.92	0.40	0.80	0.24	0.53
13.50	0.46	0.92	0.40	0.80	0.24	0.53
14.00	0.46	0.92	0.40	0.80	0.24	0.53
14.50	0.46	0.92	0.40	0.80	0.24	0.53
15.00	0.46	0.92	0.40	0.80	0.24	0.53
16.00	0.46	0.92	0.40	0.80	0.25	0.54
17.00	0.46	0.92	0.40	0.80	0.25	0.54
18.00	0.46	0.92	0.41	0.81	0.25	0.54
19.00	0.47	0.94	0.41	0.81	0.25	0.54
20.00	0.47	0.94	0.41	0.81	0.25	0.54
21.00	0.47	0.94	0.41	0.81	0.25	0.54
22.00	0.47	0.94	0.41	0.81	0.25	0.55
23.00	0.47	0.94	0.41	0.81	0.25	0.55
24.00	0.47	0.94	0.41	0.81	0.25	0.55
25.00	0.47	0.94	0.41	0.82	0.25	0.55
26.00			0.41	0.82	0.25	0.55
27.00			0.41	0.82	0.25	0.55
28.00			0.41	0.82	0.25	0.55
29.00			0.41	0.82	0.25	0.55
30.00			0.41	0.82	0.25	0.55

TABLE 31. ENSILIN TEST - TEXACO MISSISSIPPI CANYON 0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.36	0.72	0.25	0.31	0.62
0.50	0.41	0.82	0.50	0.33	0.66
1.00	0.43	0.86	1.00	0.38	0.76
1.50	0.44	0.88	1.50	0.39	0.78
2.00	0.45	0.90	2.00	0.40	0.80
2.50	0.46	0.92	2.50	0.41	0.82
3.00	0.46	0.92	3.00	0.41	0.82
3.50	0.47	0.94	3.50	0.42	0.84
4.00	0.47	0.94	4.00	0.42	0.84
4.50	0.48	0.96	4.50	0.42	0.84
5.00	0.48	0.96	5.00	0.43	0.86
5.50	0.48	0.96	5.50	0.43	0.86
6.00	0.49	0.98	6.00	0.43	0.86
6.50	0.49	0.98	6.50	0.44	0.88
7.00	0.50	1.00	7.00	0.44	0.88
7.50	0.50	1.00	7.50	0.44	0.88
8.00	0.51	1.02	8.00	0.45	0.90
8.50	0.51	1.02	8.50	0.45	0.90
9.00	0.51	1.02	9.00	0.45	0.90
9.50	0.51	1.02	9.50	0.45	0.90
10.00	0.51	1.02	10.00	0.45	0.90
10.50	0.52	1.04	10.50	0.45	0.90
11.00	0.52	1.04	11.00	0.45	0.90
11.50	0.52	1.04	11.50	0.45	0.90
12.00	0.53	1.06	12.00	0.46	0.92
12.50	0.53	1.06	12.50	0.46	0.92
13.00	0.53	1.06	13.00	0.46	0.92
13.50	0.53	1.06	13.50	0.46	0.92
14.00	0.54	1.08	14.00	0.46	0.92
14.50	0.54	1.08	14.50	0.46	0.92
15.00	0.54	1.08	15.00	0.46	0.92
16.00	0.55	1.10	16.00	0.46	0.92
17.00	0.56	1.12	17.00	0.46	0.92
18.00	0.56	1.12	18.00	0.46	0.92
19.00	0.56	1.12	19.00	0.47	0.94
20.00	0.57	1.14	20.00	0.47	0.94
21.00	0.57	1.14	21.00	0.47	0.94
22.00	0.58	1.16	22.00	0.47	0.94
23.00	0.59	1.18	23.00	0.47	0.94
24.00	0.59	1.18	24.00	0.47	0.94
25.00	0.59	1.18	25.00	0.47	0.94

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.906	Y-int (Gm H2O/Gm Clay)	0.839
Std Err of Y Est	0.010	Std Err of Y Est	0.014
R Squared	0.983	R Squared	0.824
No. of Observations	35.000	No. of Observations	35.000
Degrees of Freedom	33.000	Degrees of Freedom	33.000
Slope		Slope	
(Gm Fluid/Gm Clay Min)	0.012	(Gm Fluid/Gm Clay Min)	0.005
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 32. ENSILIN TEST - TEXACO MISSISSIPPI CANYON 0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.35	0.70	0.25	0.33	0.66
0.50	0.37	0.74	0.50	0.35	0.70
1.00	0.39	0.78	1.00	0.37	0.74
1.50	0.39	0.78	1.50	0.37	0.74
2.00	0.39	0.78	2.00	0.38	0.76
2.50	0.39	0.78	2.50	0.38	0.76
3.00	0.40	0.80	3.00	0.38	0.76
3.50	0.40	0.80	3.50	0.39	0.77
4.00	0.40	0.80	4.00	0.39	0.78
4.50	0.40	0.80	4.50	0.39	0.78
5.00	0.40	0.80	5.00	0.39	0.78
5.50	0.41	0.81	5.50	0.39	0.78
6.00	0.41	0.81	6.00	0.39	0.78
6.50	0.41	0.81	6.50	0.39	0.78
7.00	0.41	0.81	7.00	0.40	0.79
7.50	0.41	0.81	7.50	0.40	0.79
8.00	0.41	0.81	8.00	0.40	0.79
8.50	0.41	0.82	8.50	0.40	0.79
9.00	0.41	0.82	9.00	0.40	0.80
9.50	0.41	0.82	9.50	0.40	0.80
10.00	0.41	0.82	10.00	0.40	0.80
10.50	0.41	0.82	10.50	0.40	0.80
11.00	0.41	0.82	11.00	0.40	0.80
11.50	0.41	0.82	11.50	0.40	0.80
12.00	0.42	0.83	12.00	0.40	0.80
12.50	0.42	0.83	12.50	0.40	0.80
13.00	0.42	0.84	13.00	0.40	0.80
13.50	0.42	0.84	13.50	0.40	0.80
14.00	0.42	0.84	14.00	0.40	0.80
14.50	0.42	0.84	14.50	0.40	0.80
15.00	0.42	0.84	15.00	0.40	0.80
16.00	0.42	0.84	16.00	0.40	0.80
17.00	0.42	0.84	17.00	0.40	0.80
18.00	0.42	0.84	18.00	0.41	0.81
19.00	0.42	0.84	19.00	0.41	0.81
20.00	0.43	0.85	20.00	0.41	0.81
21.00	0.43	0.85	21.00	0.41	0.81
22.00	0.43	0.86	22.00	0.41	0.81
23.00	0.43	0.86	23.00	0.41	0.81
24.00	0.43	0.86	24.00	0.41	0.81
25.00	0.43	0.86	25.00	0.41	0.82
26.00	0.43	0.86	26.00	0.41	0.82
27.00	0.43	0.86	27.00	0.41	0.82
28.00	0.43	0.86	28.00	0.41	0.82
29.00	0.43	0.86	29.00	0.41	0.82
30.00	0.43	0.86	30.00	0.41	0.82

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.797	Y-int (Gm H2O/Gm Clay)	0.779
Std Err of Y Est	0.006	Std Err of Y Est	0.004
R Squared	0.917	R Squared	0.881
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.002	Slope (Gm Fluid/Gm Clay Min)	0.001
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 33. ENSILIN TEST - TEXACO MISSISSIPPI CANYON 15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.24	0.53	0.25	0.20	0.44
0.50	0.25	0.55	0.50	0.20	0.44
1.00	0.26	0.57	1.00	0.21	0.46
1.50	0.27	0.59	1.50	0.22	0.47
2.00	0.27	0.59	2.00	0.22	0.48
2.50	0.28	0.61	2.50	0.22	0.48
3.00	0.28	0.61	3.00	0.22	0.48
3.50	0.29	0.64	3.50	0.22	0.48
4.00	0.29	0.64	4.00	0.23	0.50
4.50	0.29	0.64	4.50	0.23	0.50
5.00	0.29	0.64	5.00	0.23	0.50
5.50	0.30	0.66	5.50	0.23	0.50
6.00	0.30	0.66	6.00	0.23	0.50
6.50	0.30	0.66	6.50	0.23	0.50
7.00	0.30	0.66	7.00	0.23	0.50
7.50	0.30	0.66	7.50	0.23	0.50
8.00	0.30	0.66	8.00	0.24	0.53
8.50	0.30	0.66	8.50	0.24	0.53
9.00	0.30	0.66	9.00	0.24	0.53
9.50	0.30	0.66	9.50	0.24	0.53
10.00	0.30	0.66	10.00	0.24	0.53
10.50	0.30	0.66	10.50	0.24	0.53
11.00	0.30	0.66	11.00	0.24	0.53
11.50	0.30	0.66	11.50	0.24	0.53
12.00	0.30	0.66	12.00	0.24	0.53
12.50	0.30	0.66	12.50	0.24	0.53
13.00	0.31	0.68	13.00	0.24	0.53
13.50	0.31	0.68	13.50	0.24	0.53
14.00	0.31	0.68	14.00	0.24	0.53
14.50	0.31	0.68	14.50	0.24	0.53
15.00	0.31	0.68	15.00	0.24	0.53
16.00	0.31	0.68	16.00	0.25	0.54
17.00	0.31	0.68	17.00	0.25	0.54
18.00	0.31	0.68	18.00	0.25	0.54
19.00	0.31	0.68	19.00	0.25	0.54
20.00	0.31	0.68	20.00	0.25	0.54
21.00	0.32	0.70	21.00	0.25	0.54
22.00	0.32	0.70	22.00	0.25	0.55
23.00	0.32	0.70	23.00	0.25	0.55
24.00	0.32	0.70	24.00	0.25	0.55
25.00	0.32	0.70	25.00	0.25	0.55
26.00	0.32	0.70	26.00	0.25	0.55
27.00	0.32	0.70	27.00	0.25	0.55
28.00	0.32	0.70	28.00	0.25	0.55
29.00	0.32	0.70	29.00	0.25	0.55
30.00	0.32	0.70	30.00	0.25	0.55

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.632	Y-int (Gm H2O/Gm Clay)	0.496
Std Err of Y Est	0.008	Std Err of Y Est	0.008
R Squared	0.874	R Squared	0.821
No. of Observations	40.000	No. of Observations	40.000
Degrees of Freedom	38.000	Degrees of Freedom	38.000
Slope (Gm Fluid/Gm Clay Min)	0.003	Slope (Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 34. COMPOSITE ENSILIN TEST - PIERRE
TEXACO - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 1.5% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.51	1.02	0.42	0.84	0.37	0.81
0.50	0.55	1.10	0.46	0.92	0.38	0.83
1.00	0.57	1.14	0.48	0.96	0.39	0.85
1.50	0.58	1.16	0.49	0.98	0.40	0.88
2.00	0.59	1.18	0.49	0.98	0.40	0.88
2.50	0.60	1.20	0.50	1.00	0.40	0.88
3.00	0.61	1.21	0.50	1.00	0.41	0.90
3.50	0.61	1.22	0.50	1.00	0.42	0.92
4.00	0.61	1.22	0.50	1.00	0.43	0.94
4.50	0.62	1.23	0.50	1.00	0.45	0.99
5.00	0.62	1.24	0.50	1.00	0.46	1.01
5.50	0.62	1.24	0.51	1.02	0.47	1.03
6.00	0.63	1.25	0.51	1.02	0.47	1.03
6.50	0.63	1.26	0.51	1.02	0.48	1.05
7.00	0.63	1.26	0.51	1.02	0.48	1.05
7.50	0.64	1.27	0.51	1.02	0.48	1.05
8.00	0.64	1.28	0.51	1.02	0.48	1.05
8.50	0.64	1.28	0.51	1.02	0.48	1.05
9.00	0.64	1.28	0.51	1.02	0.48	1.05
9.50	0.64	1.28	0.52	1.04	0.48	1.05
10.00	0.65	1.29	0.52	1.04	0.48	1.05
10.50	0.65	1.30	0.52	1.04	0.48	1.05
11.00	0.65	1.30	0.52	1.04	0.48	1.05
11.50	0.65	1.30	0.52	1.04	0.48	1.05
12.00	0.65	1.30	0.53	1.05	0.48	1.05
12.50	0.66	1.31	0.53	1.05	0.48	1.05
13.00	0.66	1.32	0.53	1.05	0.48	1.05
13.50	0.66	1.32	0.53	1.06	0.48	1.05
14.00	0.66	1.32	0.53	1.06	0.48	1.05
14.50	0.67	1.33	0.53	1.06	0.48	1.05
15.00	0.67	1.34	0.53	1.06	0.48	1.05
16.00	0.67	1.34	0.53	1.06	0.48	1.05
17.00	0.68	1.35	0.53	1.06	0.48	1.05
18.00	0.68	1.36	0.53	1.06	0.48	1.05
19.00	0.69	1.37	0.53	1.06	0.48	1.05
20.00	0.69	1.38	0.53	1.06	0.48	1.05
21.00	0.69	1.38	0.54	1.08	0.48	1.05
22.00	0.70	1.40	0.54	1.08	0.48	1.05
23.00	0.70	1.40	0.54	1.08	0.48	1.05
24.00	0.71	1.41	0.54	1.08	0.48	1.05
25.00	0.71	1.42	0.54	1.08	0.48	1.05
26.00	0.72	1.43	0.54	1.08	0.48	1.05
27.00	0.72	1.43	0.54	1.08	0.48	1.05
28.00	0.72	1.44	0.54	1.08	0.48	1.05
29.00	0.72	1.44	0.54	1.08	0.48	1.05
30.00	0.73	1.45	0.54	1.08	0.48	1.05
31.00	0.73	1.46				
32.00	0.73	1.46				
33.00	0.74	1.48				
34.00	0.74	1.48				
35.00	0.74	1.48				
36.00	0.75	1.50				
37.00	0.75	1.50				
38.00	0.76	1.51				
39.00	0.76	1.52				
40.00	0.76	1.52				
45.00	0.78	1.56				
50.00	0.80	1.60				
55.00	0.82	1.64				
60.00	0.84	1.68				
65.00	0.86	1.71				
70.00	0.88	1.75				
75.00	0.90	1.79				
80.00	0.91	1.81				
85.00	0.93	1.85				
90.00	0.95	1.89				
95.00	0.97	1.93				
100.00	0.98	1.95				
105.00	1.00	1.99				
110.00	1.02	2.03				
115.00	1.04	2.07				
120.00	1.06	2.11				

TABLE 35. COMPOSITE ENSILIN TEST - PIERRE
TEXACO - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.46	0.92	0.41	0.82	0.30	0.66
0.50	0.49	0.98	0.43	0.86	0.31	0.68
1.00	0.52	1.04	0.45	0.90	0.31	0.68
1.50	0.53	1.06	0.45	0.90	0.32	0.70
2.00	0.55	1.10	0.45	0.90	0.33	0.72
2.50	0.56	1.12	0.45	0.90	0.33	0.72
3.00	0.57	1.14	0.45	0.90	0.33	0.72
3.50	0.58	1.16	0.45	0.90	0.33	0.72
4.00	0.58	1.16	0.45	0.90	0.33	0.72
4.50	0.58	1.16	0.45	0.90	0.33	0.72
5.00	0.59	1.17	0.45	0.90	0.34	0.75
5.50	0.59	1.18	0.45	0.90	0.34	0.75
6.00	0.59	1.18	0.45	0.90	0.34	0.75
6.50	0.59	1.18	0.45	0.90	0.34	0.75
7.00	0.60	1.20	0.45	0.90	0.34	0.75
7.50	0.60	1.20	0.45	0.90	0.34	0.75
8.00	0.60	1.20	0.46	0.92	0.34	0.75
8.50	0.61	1.22	0.46	0.92	0.34	0.75
9.00	0.61	1.22	0.46	0.92	0.34	0.75
9.50	0.61	1.22	0.46	0.92	0.34	0.75
10.00	0.62	1.24	0.46	0.92	0.34	0.75
10.50	0.62	1.24	0.46	0.92	0.34	0.75
11.00	0.62	1.24	0.46	0.92	0.34	0.75
11.50	0.62	1.24	0.46	0.92	0.34	0.75
12.00	0.63	1.26	0.46	0.92	0.34	0.75
12.50	0.63	1.26	0.46	0.92	0.34	0.75
13.00	0.63	1.26	0.46	0.92	0.34	0.75
13.50	0.63	1.26	0.46	0.92	0.34	0.75
14.00	0.64	1.28	0.46	0.92	0.34	0.75
14.50	0.64	1.28	0.46	0.92	0.34	0.75
15.00	0.64	1.28	0.46	0.92	0.34	0.75
16.00	0.65	1.30	0.46	0.92	0.34	0.75
17.00	0.65	1.30	0.46	0.92	0.34	0.75
18.00	0.66	1.32	0.46	0.92	0.34	0.75
19.00	0.66	1.32	0.46	0.92	0.34	0.75
20.00	0.67	1.34	0.46	0.92	0.34	0.75
21.00	0.67	1.34	0.46	0.92	0.34	0.75
22.00	0.68	1.36	0.46	0.92	0.34	0.75
23.00	0.68	1.36	0.46	0.92	0.34	0.75
24.00	0.69	1.38	0.46	0.92	0.34	0.75
25.00	0.69	1.38	0.46	0.92	0.34	0.75
26.00	0.70	1.40	0.46	0.92	0.34	0.75
27.00	0.70	1.40	0.46	0.92	0.34	0.75
28.00	0.71	1.42	0.46	0.92	0.34	0.75
29.00	0.71	1.42	0.46	0.92	0.34	0.75
30.00	0.72	1.44	0.46	0.92	0.34	0.75
31.00	0.72	1.44				
32.00	0.73	1.46				
33.00	0.73	1.46				
34.00	0.74	1.48				
35.00	0.74	1.48				
36.00	0.75	1.50				
37.00	0.75	1.50				
38.00	0.76	1.52				
39.00	0.76	1.52				
40.00	0.77	1.54				
45.00	0.80	1.60				
50.00	0.81	1.62				
55.00	0.83	1.66				
60.00	0.86	1.71				
65.00	0.88	1.75				
70.00	0.90	1.79				

TABLE 36. ENSILIN TEST - PIERRE TEXACO
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBEI (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.51	1.02	0.25	0.46	0.92
0.50	0.55	1.10	0.50	0.49	0.98
1.00	0.57	1.14	1.00	0.52	1.04
1.50	0.58	1.16	1.50	0.53	1.06
2.00	0.59	1.18	2.00	0.55	1.10
2.50	0.60	1.20	2.50	0.56	1.12
3.00	0.61	1.21	3.00	0.57	1.14
3.50	0.61	1.22	3.50	0.58	1.16
4.00	0.61	1.22	4.00	0.58	1.16
4.50	0.62	1.23	4.50	0.58	1.16
5.00	0.62	1.24	5.00	0.59	1.17
5.50	0.62	1.24	5.50	0.59	1.18
6.00	0.63	1.25	6.00	0.59	1.18
6.50	0.63	1.26	6.50	0.59	1.18
7.00	0.63	1.26	7.00	0.60	1.20
7.50	0.64	1.27	7.50	0.60	1.20
8.00	0.64	1.28	8.00	0.60	1.20
8.50	0.64	1.28	8.50	0.61	1.22
9.00	0.64	1.28	9.00	0.61	1.22
9.50	0.64	1.28	9.50	0.61	1.22
10.00	0.65	1.29	10.00	0.62	1.24
10.50	0.65	1.30	10.50	0.62	1.24
11.00	0.65	1.30	11.00	0.62	1.24
11.50	0.65	1.30	11.50	0.62	1.24
12.00	0.65	1.30	12.00	0.63	1 26
12.50	0.66	1.31	12.50	0.63	1.26
13.00	0.66	1.32	13.00	0.63	1.26
13.50	0.66	1.32	13.50	0.63	1.26
14.00	0.66	1.32	14.00	0.64	1.28
14.50	0.67	1.33	14.50	0.64	1.28
15.00	0.67	1.34	15.00	0.64	1.28
16.00	0.67	1.34	16.00	0.65	1.30
17.00	0.68	1.35	17.00	0.65	1.30
18.00	0.68	1.36	18.00	0.66	1.32
19.00	0.69	1.37	19.00	0.66	1.32
20.00	0.69	1.38	20.00	0.67	1.34
21.00	0.69	1.38	21.00	0.67	1.34
22.00	0.70	1.40	22.00	0.68	1.36
23.00	0.70	1.40	23.00	0.68	1.36
24.00	0.71	1.41	24.00	0.69	1.38
25.00	0.71	1.42	25.00	0.69	1.38
26.00	0.72	1.43	26.00	0.70	1.40
27.00	0.72	1.43	27.00	0.70	1.40
28.00	0.72	1.44	28.00	0.71	1.42
29.00	0.72	1.44	29.00	0.71	1.42
30.00	0.73	1.45	30.00	0.72	1.44
31.00	0.73	1.46	31.00	0.72	1.44
32.00	0.73	1.46	32.00	0.73	1.46
33.00	0.74	1.48	33.00	0.73	1.46
34.00	0.74	1.48	34.00	0.74	1.48
35.00	0.74	1.48	35.00	0.74	1.48
36.00	0.75	1.50	36.00	0.75	1.50
37.00	0.75	1.50	37.00	0.75	1.50
38.00	0.76	1.51	38.00	0.76	1.52
39.00	0.76	1.52	39.00	0.76	1.52
40.00	0.76	1.52	40.00	0.77	1.54
45.00	0.78	1.56	45.00	0.80	1.60
50.00	0.80	1.60	50.00	0.81	1.62
55.00	0.82	1.64	55.00	0.83	1.66
60.00	0.84	1.68	60.00	0.86	1.71
65.00	0.86	1.71	65.00	0.88	1.75
70.00	0.88	1.75	70.00	0.90	1.79
75.00	0.90	1.79			
80.00	0.91	1.81			
85.00	0.93	1.85			
90.00	0.95	1.89			
95.00	0.97	1.93			
100.00	0.98	1.95			
105.00	1.00	1.99			
110.00	1.02	2.03			
115.00	1.04	2.07			
120.00	1.06	2.11			

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.221	Y-int (Gm H2O/Gm Clay)	1.139
Std Err of Y Est	0.006	Std Err of Y Est	0.008
R Squared	0.999	R Squared	0.997
No. of Observations	52.000	No. of Observations	42.000
Degrees of Freedom	50.000	Degrees of Freedom	40.000
Slope (Gm Fluid/Gm Clay Min)	0.007	Slope (Gm Fluid/Gm Clay Min)	0.010
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 37. ENSILIN TEST - PIERRE TEXACO
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.42	0.84	0.25	0.41	0.82
0.50	0.46	0.92	0.50	0.43	0.86
1.00	0.48	0.96	1.00	0.45	0.90
1.50	0.49	0.98	1.50	0.45	0.90
2.00	0.49	0.98	2.00	0.45	0.90
2.50	0.50	1.00	2.50	0.45	0.90
3.00	0.50	1.00	3.00	0.45	0.90
3.50	0.50	1.00	3.50	0.45	0.90
4.00	0.50	1.00	4.00	0.45	0.90
4.50	0.50	1.00	4.50	0.45	0.90
5.00	0.50	1.00	5.00	0.45	0.90
5.50	0.51	1.02	5.50	0.45	0.90
6.00	0.51	1.02	6.00	0.45	0.90
6.50	0.51	1.02	6.50	0.45	0.90
7.00	0.51	1.02	7.00	0.45	0.90
7.50	0.51	1.02	7.50	0.45	0.90
8.00	0.51	1.02	8.00	0.46	0.92
8.50	0.51	1.02	8.50	0.46	0.92
9.00	0.51	1.02	9.00	0.46	0.92
9.50	0.52	1.04	9.50	0.46	0.92
10.00	0.52	1.04	10.00	0.46	0.92
10.50	0.52	1.04	10.50	0.46	0.92
11.00	0.52	1.04	11.00	0.46	0.92
11.50	0.52	1.04	11.50	0.46	0.92
12.00	0.53	1.05	12.00	0.46	0.92
12.50	0.53	1.05	12.50	0.46	0.92
13.00	0.53	1.05	13.00	0.46	0.92
13.50	0.53	1.06	13.50	0.46	0.92
14.00	0.53	1.06	14.00	0.46	0.92
14.50	0.53	1.06	14.50	0.46	0.92
15.00	0.53	1.06	15.00	0.46	0.92
16.00	0.53	1.06	16.00	0.46	0.92
17.00	0.53	1.06	17.00	0.46	0.92
18.00	0.53	1.06	18.00	0.46	0.92
19.00	0.53	1.06	19.00	0.46	0.92
20.00	0.53	1.06	20.00	0.46	0.92
21.00	0.54	1.08	21.00	0.46	0.92
22.00	0.54	1.08	22.00	0.46	0.92
23.00	0.54	1.08	23.00	0.46	0.92
24.00	0.54	1.08	24.00	0.46	0.92
25.00	0.54	1.08	25.00	0.46	0.92
26.00	0.54	1.08	26.00	0.46	0.92
27.00	0.54	1.08	27.00	0.46	0.92
28.00	0.54	1.08	28.00	0.46	0.92
29.00	0.54	1.08	29.00	0.46	0.92
30.00	0.54	1.08	30.00	0.46	0.92

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.023	Y-int (Gm H2O/Gm Clay)	0.920
Std Err of Y Est	0.006	Std Err of Y Est	0.000
R Squared	0.856	R Squared	0.000
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope		Slope	
(Gm Fluid/Gm Clay Min)	0.002	(Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 38. ENSILIN TEST - PIERRE TEXACO
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.37	0.81	0.25	0.30	0.66
0.50	0.38	0.83	0.50	0.31	0.68
1.00	0.39	0.85	1.00	0.31	0.68
1.50	0.40	0.88	1.50	0.32	0.70
2.00	0.40	0.88	2.00	0.33	0.72
2.50	0.40	0.88	2.50	0.33	0.72
3.00	0.41	0.90	3.00	0.33	0.72
3.50	0.42	0.92	3.50	0.33	0.72
4.00	0.43	0.94	4.00	0.33	0.72
4.50	0.45	0.99	4.50	0.33	0.72
5.00	0.46	1.01	5.00	0.34	0.75
5.50	0.47	1.03	5.50	0.34	0.75
6.00	0.47	1.03	6.00	0.34	0.75
6.50	0.48	1.05	6.50	0.34	0.75
7.00	0.48	1.05	7.00	0.34	0.75
7.50	0.48	1.05	7.50	0.34	0.75
8.00	0.48	1.05	8.00	0.34	0.75
8.50	0.48	1.05	8.50	0.34	0.75
9.00	0.48	1.05	9.00	0.34	0.75
9.50	0.48	1.05	9.50	0.34	0.75
10.00	0.48	1.05	10.00	0.34	0.75
10.50	0.48	1.05	10.50	0.34	0.75
11.00	0.48	1.05	11.00	0.34	0.75
11.50	0.48	1.05	11.50	0.34	0.75
12.00	0.48	1.05	12.00	0.34	0.75
12.50	0.48	1.05	12.50	0.34	0.75
13.00	0.48	1.05	13.00	0.34	0.75
13.50	0.48	1.05	13.50	0.34	0.75
14.00	0.48	1.05	14.00	0.34	0.75
14.50	0.48	1.05	14.50	0.34	0.75
15.00	0.48	1.05	15.00	0.34	0.75
16.00	0.48	1.05	16.00	0.34	0.75
17.00	0.48	1.05	17.00	0.34	0.75
18.00	0.48	1.05	18.00	0.34	0.75
19.00	0.48	1.05	19.00	0.34	0.75
20.00	0.48	1.05	20.00	0.34	0.75
21.00	0.48	1.05	21.00	0.34	0.75
22.00	0.48	1.05	22.00	0.34	0.75
23.00	0.48	1.05	23.00	0.34	0.75
24.00	0.48	1.05	24.00	0.34	0.75
25.00	0.48	1.05	25.00	0.34	0.75
26.00	0.48	1.05	26.00	0.34	0.75
27.00	0.48	1.05	27.00	0.34	0.75
28.00	0.48	1.05	28.00	0.34	0.75
29.00	0.48	1.05	29.00	0.34	0.75
30.00	0.48	1.05	30.00	0.34	0.75

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.052	Y-int (Gm H2O/Gm Clay)	0.745
Std Err of Y Est	0.000	Std Err of Y Est	0.000
R Squared	0.000	R Squared	0.000
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.000	Slope (Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 39. COMPOSITE ENSILIN TEST - PIERRE
MUDTECH - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.40	0.80	0.35	0.70	0.17	0.37
0.50	0.42	0.84	0.35	0.70	0.18	0.39
1.00	0.43	0.86	0.35	0.70	0.18	0.39
1.50	0.44	0.88	0.36	0.71	0.18	0.39
2.00	0.44	0.88	0.36	0.72	0.18	0.39
2.50	0.44	0.88	0.36	0.72	0.18	0.39
3.00	0.45	0.90	0.36	0.72	0.18	0.39
3.50	0.45	0.90	0.36	0.72	0.18	0.39
4.00	0.45	0.90	0.36	0.72	0.18	0.39
4.50	0.45	0.90	0.37	0.74	0.18	0.39
5.00	0.45	0.90	0.37	0.74	0.18	0.39
5.50	0.45	0.90	0.37	0.74	0.18	0.39
6.00	0.46	0.92	0.37	0.74	0.18	0.39
6.50	0.46	0.92	0.37	0.74	0.18	0.39
7.00	0.46	0.92	0.37	0.74	0.18	0.39
7.50	0.46	0.92	0.37	0.74	0.18	0.39
8.00	0.46	0.92	0.38	0.76	0.18	0.39
8.50	0.46	0.92	0.38	0.76	0.18	0.39
9.00	0.47	0.94	0.38	0.76	0.18	0.39
9.50	0.47	0.94	0.38	0.76	0.18	0.39
10.00	0.47	0.94	0.38	0.76	0.18	0.39
10.50	0.47	0.94	0.38	0.76	0.18	0.39
11.00	0.47	0.94	0.38	0.76	0.18	0.39
11.50	0.47	0.94	0.38	0.76	0.18	0.39
12.00	0.48	0.96	0.38	0.76	0.18	0.39
12.50	0.48	0.96	0.38	0.76	0.18	0.39
13.00	0.48	0.96	0.38	0.76	0.18	0.39
13.50	0.48	0.96	0.38	0.76	0.18	0.39
14.00	0.48	0.96	0.38	0.76	0.18	0.39
14.50	0.48	0.96	0.38	0.76	0.18	0.39
15.00	0.48	0.96	0.38	0.76	0.18	0.39
16.00	0.50	1.00	0.39	0.77	0.18	0.39
17.00	0.50	1.00	0.39	0.77	0.18	0.39
18.00	0.50	1.00	0.39	0.77	0.18	0.39
19.00	0.51	1.02	0.39	0.77	0.18	0.39
20.00	0.51	1.02	0.39	0.78	0.18	0.39
21.00	0.51	1.02	0.39	0.78	0.18	0.39
22.00	0.51	1.02	0.39	0.78	0.18	0.39
23.00	0.52	1.04	0.40	0.79	0.18	0.39
24.00	0.52	1.04	0.40	0.79	0.18	0.39
25.00	0.52	1.04	0.40	0.79	0.18	0.39
26.00	0.53	1.06	0.40	0.79	0.18	0.39
27.00	0.53	1.06	0.40	0.80	0.18	0.39
28.00	0.53	1.06	0.40	0.80	0.18	0.39
29.00	0.53	1.06	0.40	0.80	0.18	0.39
30.00	0.54	1.08	0.40	0.80	0.18	0.39

TABLE 10. COMPOSITE ENSILIN TEST - PIERRE
MUDTECH - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.28	0.56	0.32	0.64	0.19	0.42
0.50	0.28	0.56	0.32	0.64	0.19	0.42
1.00	0.28	0.56	0.32	0.64	0.19	0.42
1.50	0.28	0.56	0.33	0.65	0.19	0.42
2.00	0.28	0.56	0.33	0.65	0.19	0.42
2.50	0.28	0.56	0.33	0.65	0.19	0.42
3.00	0.28	0.56	0.33	0.65	0.19	0.42
3.50	0.28	0.56	0.33	0.66	0.19	0.42
4.00	0.28	0.56	0.33	0.66	0.19	0.42
4.50	0.28	0.56	0.33	0.66	0.19	0.42
5.00	0.28	0.56	0.33	0.66	0.19	0.42
5.50	0.28	0.56	0.33	0.66	0.19	0.42
6.00	0.28	0.56	0.33	0.66	0.19	0.42
6.50	0.28	0.56	0.33	0.66	0.19	0.42
7.00	0.28	0.56	0.33	0.66	0.19	0.42
7.50	0.28	0.56	0.33	0.66	0.19	0.42
8.00	0.28	0.56	0.33	0.66	0.19	0.42
8.50	0.28	0.56	0.33	0.66	0.19	0.42
9.00	0.28	0.56	0.34	0.67	0.19	0.42
9.50	0.28	0.56	0.34	0.67	0.19	0.42
10.00	0.28	0.56	0.34	0.67	0.19	0.42
10.50	0.28	0.56	0.34	0.67	0.19	0.42
11.00	0.28	0.56	0.34	0.67	0.19	0.42
11.50	0.28	0.56	0.34	0.67	0.19	0.42
12.00	0.28	0.56	0.34	0.67	0.19	0.42
12.50	0.28	0.56	0.34	0.68	0.19	0.42
13.00	0.28	0.56	0.34	0.68	0.19	0.42
13.50	0.28	0.56	0.34	0.68	0.19	0.42
14.00	0.28	0.56	0.34	0.68	0.19	0.42
14.50	0.28	0.56	0.34	0.68	0.19	0.42
15.00	0.28	0.56	0.34	0.68	0.19	0.42
16.00	0.28	0.56	0.34	0.68	0.19	0.42
17.00	0.28	0.56	0.34	0.68	0.19	0.42
18.00	0.28	0.56	0.34	0.68	0.19	0.42
19.00	0.28	0.56	0.34	0.68	0.19	0.42
20.00	0.28	0.56	0.34	0.68	0.19	0.42
21.00	0.28	0.56	0.34	0.68	0.19	0.42
22.00	0.28	0.56	0.34	0.68	0.19	0.42
23.00	0.28	0.56	0.34	0.68	0.19	0.42
24.00	0.28	0.56	0.34	0.68	0.19	0.42
25.00	0.28	0.56	0.34	0.68	0.19	0.42
26.00	0.28	0.56	0.34	0.68	0.19	0.42
27.00	0.28	0.56	0.34	0.68	0.19	0.42
28.00	0.28	0.56	0.34	0.68	0.19	0.42
29.00	0.28	0.56	0.34	0.68	0.19	0.42
30.00	0.28	0.56	0.34	0.68	0.19	0.42

TABLE 41. ENSILIN TEST - PIERRE MUDTECH
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.40	0.80	0.25	0.28	0.56
0.50	0.42	0.84	0.50	0.28	0.56
1.00	0.43	0.86	1.00	0.28	0.56
1.50	0.44	0.88	1.50	0.28	0.56
2.00	0.44	0.88	2.00	0.28	0.56
2.50	0.44	0.88	2.50	0.28	0.56
3.00	0.45	0.90	3.00	0.28	0.56
3.50	0.45	0.90	3.50	0.28	0.56
4.00	0.45	0.90	4.00	0.28	0.56
4.50	0.45	0.90	4.50	0.28	0.56
5.00	0.45	0.90	5.00	0.28	0.56
5.50	0.45	0.90	5.50	0.28	0.56
6.00	0.46	0.92	6.00	0.28	0.56
6.50	0.46	0.92	6.50	0.28	0.56
7.00	0.46	0.92	7.00	0.28	0.56
7.50	0.46	0.92	7.50	0.28	0.56
8.00	0.46	0.92	8.00	0.28	0.56
8.50	0.46	0.92	8.50	0.28	0.56
9.00	0.47	0.94	9.00	0.28	0.56
9.50	0.47	0.94	9.50	0.28	0.56
10.00	0.47	0.94	10.00	0.28	0.56
10.50	0.47	0.94	10.50	0.28	0.56
11.00	0.47	0.94	11.00	0.28	0.56
11.50	0.47	0.94	11.50	0.28	0.56
12.00	0.48	0.96	12.00	0.28	0.56
12.50	0.48	0.96	12.50	0.28	0.56
13.00	0.48	0.96	13.00	0.28	0.56
13.50	0.48	0.96	13.50	0.28	0.56
14.00	0.48	0.96	14.00	0.28	0.56
14.50	0.48	0.96	14.50	0.28	0.56
15.00	0.48	0.96	15.00	0.28	0.56
16.00	0.50	1.00	16.00	0.28	0.56
17.00	0.50	1.00	17.00	0.28	0.56
18.00	0.50	1.00	18.00	0.28	0.56
19.00	0.51	1.02	19.00	0.28	0.56
20.00	0.51	1.02	20.00	0.28	0.56
21.00	0.51	1.02	21.00	0.28	0.56
22.00	0.51	1.02	22.00	0.28	0.56
23.00	0.52	1.04	23.00	0.28	0.56
24.00	0.52	1.04	24.00	0.28	0.56
25.00	0.52	1.04	25.00	0.28	0.56
26.00	0.53	1.06	26.00	0.28	0.56
27.00	0.53	1.06	27.00	0.28	0.56
28.00	0.53	1.06	28.00	0.28	0.56
29.00	0.53	1.06	29.00	0.28	0.56
30.00	0.54	1.08	30.00	0.28	0.56

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.866	Y-int (Gm H2O/Gm Clay)	0.558
Std Err of Y Est	0.008	Std Err of Y Est	0.000
R Squared	0.977	R Squared	0.000
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.007	Slope (Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 42. ENSILIN TEST - PIERRE MUDTECH
0.5% KCl/H20

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.35	0.70	0.25	0.32	0.64
0.50	0.35	0.70	0.50	0.32	0.64
1.00	0.35	0.70	1.00	0.32	0.64
1.50	0.36	0.71	1.50	0.33	0.65
2.00	0.36	0.72	2.00	0.33	0.65
2.50	0.36	0.72	2.50	0.33	0.65
3.00	0.36	0.72	3.00	0.33	0.65
3.50	0.36	0.72	3.50	0.33	0.66
4.00	0.36	0.72	4.00	0.33	0.66
4.50	0.37	0.74	4.50	0.33	0.66
5.00	0.37	0.74	5.00	0.33	0.66
5.50	0.37	0.74	5.50	0.33	0.66
6.00	0.37	0.74	6.00	0.33	0.66
6.50	0.37	0.74	6.50	0.33	0.66
7.00	0.37	0.74	7.00	0.33	0.66
7.50	0.37	0.74	7.50	0.33	0.66
8.00	0.38	0.76	8.00	0.33	0.66
8.50	0.38	0.76	8.50	0.33	0.66
9.00	0.38	0.76	9.00	0.34	0.67
9.50	0.38	0.76	9.50	0.34	0.67
10.00	0.38	0.76	10.00	0.34	0.67
10.50	0.38	0.76	10.50	0.34	0.67
11.00	0.38	0.76	11.00	0.34	0.67
11.50	0.38	0.76	11.50	0.34	0.67
12.00	0.38	0.76	12.00	0.34	0.67
12.50	0.38	0.76	12.50	0.34	0.68
13.00	0.38	0.76	13.00	0.34	0.68
13.50	0.38	0.76	13.50	0.34	0.68
14.00	0.38	0.76	14.00	0.34	0.68
14.50	0.38	0.76	14.50	0.34	0.68
15.00	0.38	0.76	15.00	0.34	0.68
16.00	0.39	0.77	16.00	0.34	0.68
17.00	0.39	0.77	17.00	0.34	0.68
18.00	0.39	0.77	18.00	0.34	0.68
19.00	0.39	0.77	19.00	0.34	0.68
20.00	0.39	0.78	20.00	0.34	0.68
21.00	0.39	0.78	21.00	0.34	0.68
22.00	0.39	0.78	22.00	0.34	0.68
23.00	0.40	0.79	23.00	0.34	0.68
24.00	0.40	0.79	24.00	0.34	0.68
25.00	0.40	0.79	25.00	0.34	0.68
26.00	0.40	0.79	26.00	0.34	0.68
27.00	0.40	0.80	27.00	0.34	0.68
28.00	0.40	0.80	28.00	0.34	0.68
29.00	0.40	0.80	29.00	0.34	0.68
30.00	0.40	0.80	30.00	0.34	0.68

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.730	Y-int (Gm H20/Gm Clay)	0.671
Std Err of Y Est	0.003	Std Err of Y Est	0.003
R Squared	0.952	R Squared	0.351
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.002	Slope (Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 43. ENSILIN TEST - PIERRE MUDTECH
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.17	0.37	0.25	0.19	0.42
0.50	0.18	0.39	0.50	0.19	0.42
1.00	0.18	0.39	1.00	0.19	0.42
1.50	0.18	0.39	1.50	0.19	0.42
2.00	0.18	0.39	2.00	0.19	0.42
2.50	0.18	0.39	2.50	0.19	0.42
3.00	0.18	0.39	3.00	0.19	0.42
3.50	0.18	0.39	3.50	0.19	0.42
4.00	0.18	0.39	4.00	0.19	0.42
4.50	0.18	0.39	4.50	0.19	0.42
5.00	0.18	0.39	5.00	0.19	0.42
5.50	0.18	0.39	5.50	0.19	0.42
6.00	0.18	0.39	6.00	0.19	0.42
6.50	0.18	0.39	6.50	0.19	0.42
7.00	0.18	0.39	7.00	0.19	0.42
7.50	0.18	0.39	7.50	0.19	0.42
8.00	0.18	0.39	8.00	0.19	0.42
8.50	0.18	0.39	8.50	0.19	0.42
9.00	0.18	0.39	9.00	0.19	0.42
9.50	0.18	0.39	9.50	0.19	0.42
10.00	0.18	0.39	10.00	0.19	0.42
10.50	0.18	0.39	10.50	0.19	0.42
11.00	0.18	0.39	11.00	0.19	0.42
11.50	0.18	0.39	11.50	0.19	0.42
12.00	0.18	0.39	12.00	0.19	0.42
12.50	0.18	0.39	12.50	0.19	0.42
13.00	0.18	0.39	13.00	0.19	0.42
13.50	0.18	0.39	13.50	0.19	0.42
14.00	0.18	0.39	14.00	0.19	0.42
14.50	0.18	0.39	14.50	0.19	0.42
15.00	0.18	0.39	15.00	0.19	0.42
16.00	0.18	0.39	16.00	0.19	0.42
17.00	0.18	0.39	17.00	0.19	0.42
18.00	0.18	0.39	18.00	0.19	0.42
19.00	0.18	0.39	19.00	0.19	0.42
20.00	0.18	0.39	20.00	0.19	0.42
21.00	0.18	0.39	21.00	0.19	0.42
22.00	0.18	0.39	22.00	0.19	0.42
23.00	0.18	0.39	23.00	0.19	0.42
24.00	0.18	0.39	24.00	0.19	0.42
25.00	0.18	0.39	25.00	0.19	0.42
26.00	0.18	0.39	26.00	0.19	0.42
27.00	0.18	0.39	27.00	0.19	0.42
28.00	0.18	0.39	28.00	0.19	0.42
29.00	0.18	0.39	29.00	0.19	0.42
30.00	0.18	0.39	30.00	0.19	0.42

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	0.394	Y-int (Gm H2O/Gm Clay)	0.416
Std Err of Y Est	0.000	Std Err of Y Est	0.000
R Squared	0.000	R Squared	0.000
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.000	Slope (Gm Fluid/Gm Clay Min)	0.000
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 44. COMPOSITE ENSILIN TEST - STANDARD TEXAS - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.60	1.20	0.79	1.58	0.80	1.75
0.50	0.81	1.62	0.95	1.90	0.86	1.88
1.00	0.97	1.93	1.00	2.00	0.87	1.91
1.50	1.01	2.01	1.04	2.08	0.88	1.93
2.00	1.03	2.05	1.04	2.08	0.88	1.93
2.50	1.04	2.07	1.05	2.09	0.88	1.93
3.00	1.05	2.09	1.05	2.10	0.89	1.94
3.50	1.06	2.11	1.05	2.10	0.89	1.95
4.00	1.07	2.13	1.06	2.12	0.89	1.95
4.50	1.07	2.13	1.06	2.12	0.89	1.95
5.00	1.08	2.15	1.06	2.12	0.89	1.95
5.50	1.08	2.15	1.07	2.14	0.89	1.95
6.00	1.08	2.15	1.07	2.14	0.89	1.95
6.50	1.09	2.17	1.07	2.14	0.89	1.95
7.00	1.09	2.17	1.07	2.14	0.90	1.96
7.50	1.10	2.19	1.08	2.15	0.90	1.96
8.00	1.10	2.19	1.08	2.16	0.90	1.96
8.50	1.10	2.19	1.08	2.16	0.90	1.97
9.00	1.11	2.21	1.08	2.16	0.90	1.97
9.50	1.11	2.21	1.08	2.16	0.90	1.97
10.00	1.11	2.21	1.08	2.16	0.90	1.97
10.50	1.11	2.21	1.08	2.16	0.90	1.97
11.00	1.12	2.23	1.08	2.16	0.90	1.97
11.50	1.12	2.23	1.08	2.16	0.90	1.97
12.00	1.12	2.23	1.09	2.18	0.90	1.97
12.50	1.13	2.25	1.09	2.18	0.90	1.97
13.00	1.13	2.25	1.09	2.18	0.90	1.97
13.50	1.13	2.25	1.09	2.18	0.91	1.98
14.00	1.13	2.25	1.09	2.18	0.91	1.98
14.50	1.13	2.25	1.09	2.18	0.91	1.98
15.00	1.13	2.25	1.10	2.20	0.91	1.98
16.00	1.14	2.27	1.10	2.20	0.91	1.99
17.00	1.14	2.27	1.10	2.20	0.91	1.99
18.00	1.15	2.29	1.10	2.20	0.91	1.99
19.00	1.15	2.29	1.10	2.20	0.91	1.99
20.00	1.15	2.29	1.11	2.22	0.91	1.99
21.00	1.16	2.31	1.11	2.22	0.91	1.99
22.00	1.16	2.31	1.11	2.22	0.91	1.99
23.00	1.16	2.31	1.11	2.22	0.91	1.99
24.00	1.17	2.33	1.11	2.22	0.92	2.02
25.00	1.17	2.33	1.12	2.24	0.92	2.02
26.00	1.17	2.33	1.12	2.24	0.92	2.02
27.00	1.18	2.35	1.12	2.24	0.92	2.02
28.00	1.18	2.35	1.12	2.24	0.92	2.02
29.00	1.19	2.37	1.12	2.24	0.92	2.02
30.00	1.19	2.37	1.12	2.24	0.93	2.03

TABLE 45. COMPOSITE ENSILIN TEST - STANDARD TEXAS - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.62	1.24	0.67	1.34	0.51	1.12
0.50	0.79	1.58	0.88	1.76	0.60	1.31
1.00	0.95	1.89	0.92	1.83	0.62	1.36
1.50	0.96	1.91	0.93	1.86	0.63	1.37
2.00	0.97	1.93	0.94	1.87	0.63	1.38
2.50	0.98	1.95	0.94	1.88	0.63	1.38
3.00	0.98	1.95	0.94	1.88	0.64	1.39
3.50	0.98	1.95	0.95	1.89	0.64	1.39
4.00	0.99	1.97	0.95	1.90	0.64	1.40
4.50	0.99	1.97	0.95	1.90	0.64	1.40
5.00	1.00	1.99	0.95	1.90	0.64	1.40
5.50	1.00	1.99	0.96	1.91	0.65	1.41
6.00	1.00	1.99	0.96	1.91	0.65	1.42
6.50	1.00	1.99	0.96	1.92	0.65	1.42
7.00	1.00	1.99	0.96	1.92	0.65	1.42
7.50	1.00	1.99	0.96	1.92	0.65	1.42
8.00	1.00	1.99	0.96	1.92	0.65	1.42
8.50	1.00	1.99	0.96	1.92	0.65	1.42
9.00	1.00	1.99	0.96	1.92	0.65	1.42
9.50	1.00	1.99	0.97	1.93	0.65	1.42
10.00	1.00	1.99	0.97	1.93	0.66	1.44
10.50	1.01	2.01	0.97	1.94	0.66	1.44
11.00	1.01	2.01	0.97	1.94	0.66	1.45
11.50	1.01	2.01	0.97	1.94	0.66	1.45
12.00	1.01	2.01	0.97	1.94	0.66	1.45
12.50	1.01	2.01	0.97	1.94	0.66	1.45
13.00	1.01	2.01	0.97	1.94	0.66	1.45
13.50	1.01	2.01	0.97	1.94	0.66	1.45
14.00	1.01	2.01	0.97	1.94	0.66	1.45
14.50	1.01	2.01	0.97	1.94	0.66	1.45
15.00	1.01	2.01	0.97	1.94	0.66	1.45
16.00	1.01	2.01	0.97	1.94	0.66	1.45
17.00	1.01	2.01	0.97	1.94	0.66	1.45
18.00	1.01	2.01	0.97	1.94	0.67	1.46
19.00	1.01	2.01	0.97	1.94	0.67	1.47
20.00	1.02	2.03	0.98	1.96	0.67	1.47
21.00	1.02	2.03	0.98	1.96	0.67	1.47
22.00	1.02	2.03	0.98	1.96	0.67	1.47
23.00	1.02	2.03	0.98	1.96	0.67	1.47
24.00	1.02	2.03	0.98	1.96	0.67	1.47
25.00	1.02	2.03	0.98	1.96	0.67	1.47
26.00	1.02	2.03	0.98	1.96	0.67	1.47
27.00	1.02	2.03	0.98	1.96	0.67	1.47
28.00	1.02	2.03	0.98	1.96	0.67	1.47
29.00	1.02	2.03	0.98	1.96	0.67	1.47
30.00	1.02	2.03	0.98	1.96	0.67	1.47

TABLE 46. ENSILIN TEST - STANDARD TEXAS
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.60	1.20	0.25	0.62	1.24
0.50	0.81	1.62	0.50	0.79	1.58
1.00	0.97	1.93	1.00	0.95	1.89
1.50	1.01	2.01	1.50	0.96	1.91
2.00	1.03	2.05	2.00	0.97	1.93
2.50	1.04	2.07	2.50	0.98	1.95
3.00	1.05	2.09	3.00	0.98	1.95
3.50	1.06	2.11	3.50	0.98	1.95
4.00	1.07	2.13	4.00	0.99	1.97
4.50	1.07	2.13	4.50	0.99	1.97
5.00	1.08	2.15	5.00	1.00	1.99
5.50	1.08	2.15	5.50	1.00	1.99
6.00	1.08	2.15	6.00	1.00	1.99
6.50	1.09	2.17	6.50	1.00	1.99
7.00	1.09	2.17	7.00	1.00	1.99
7.50	1.10	2.19	7.50	1.00	1.99
8.00	1.10	2.19	8.00	1.00	1.99
8.50	1.10	2.19	8.50	1.00	1.99
9.00	1.11	2.21	9.00	1.00	1.99
9.50	1.11	2.21	9.50	1.00	1.99
10.00	1.11	2.21	10.00	1.00	1.99
10.50	1.11	2.21	10.50	1.01	2.01
11.00	1.12	2.23	11.00	1.01	2.01
11.50	1.12	2.23	11.50	1.01	2.01
12.00	1.12	2.23	12.00	1.01	2.01
12.50	1.13	2.25	12.50	1.01	2.01
13.00	1.13	2.25	13.00	1.01	2.01
13.50	1.13	2.25	13.50	1.01	2.01
14.00	1.13	2.25	14.00	1.01	2.01
14.50	1.13	2.25	14.50	1.01	2.01
15.00	1.13	2.25	15.00	1.01	2.01
16.00	1.14	2.27	16.00	1.01	2.01
17.00	1.14	2.27	17.00	1.01	2.01
18.00	1.15	2.29	18.00	1.01	2.01
19.00	1.15	2.29	19.00	1.01	2.01
20.00	1.15	2.29	20.00	1.02	2.03
21.00	1.16	2.31	21.00	1.02	2.03
22.00	1.16	2.31	22.00	1.02	2.03
23.00	1.16	2.31	23.00	1.02	2.03
24.00	1.17	2.33	24.00	1.02	2.03
25.00	1.17	2.33	25.00	1.02	2.03
26.00	1.17	2.33	26.00	1.02	2.03
27.00	1.18	2.35	27.00	1.02	2.03
28.00	1.18	2.35	28.00	1.02	2.03
29.00	1.19	2.37	29.00	1.02	2.03
30.00	1.19	2.37	30.00	1.02	2.03

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	2.147	Y-int (Gm H2O/Gm Clay)	1.993
Std Err of Y Est	0.007	Std Err of Y Est	0.006
R Squared	0.982	R Squared	0.768
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.008	Slope (Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 47. ENSILIN TEST - STANDARD TEXAS
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.79	1.58	0.25	0.67	1.34
0.50	0.95	1.90	0.50	0.88	1.76
1.00	1.00	2.00	1.00	0.92	1.83
1.50	1.04	2.08	1.50	0.93	1.86
2.00	1.04	2.08	2.00	0.94	1.87
2.50	1.05	2.09	2.50	0.94	1.88
3.00	1.05	2.10	3.00	0.94	1.88
3.50	1.05	2.10	3.50	0.95	1.89
4.00	1.06	2.12	4.00	0.95	1.90
4.50	1.06	2.12	4.50	0.95	1.90
5.00	1.06	2.12	5.00	0.95	1.90
5.50	1.07	2.14	5.50	0.96	1.91
6.00	1.07	2.14	6.00	0.96	1.91
6.50	1.07	2.14	6.50	0.96	1.92
7.00	1.07	2.14	7.00	0.96	1.92
7.50	1.08	2.15	7.50	0.96	1.92
8.00	1.08	2.16	8.00	0.96	1.92
8.50	1.08	2.16	8.50	0.96	1.92
9.00	1.08	2.16	9.00	0.96	1.92
9.50	1.08	2.16	9.50	0.97	1.93
10.00	1.08	2.16	10.00	0.97	1.93
10.50	1.08	2.16	10.50	0.97	1.94
11.00	1.08	2.16	11.00	0.97	1.94
11.50	1.08	2.16	11.50	0.97	1.94
12.00	1.09	2.18	12.00	0.97	1.94
12.50	1.09	2.18	12.50	0.97	1.94
13.00	1.09	2.18	13.00	0.97	1.94
13.50	1.09	2.18	13.50	0.97	1.94
14.00	1.09	2.18	14.00	0.97	1.94
14.50	1.09	2.18	14.50	0.97	1.94
15.00	1.10	2.20	15.00	0.97	1.94
16.00	1.10	2.20	16.00	0.97	1.94
17.00	1.10	2.20	17.00	0.97	1.94
18.00	1.10	2.20	18.00	0.97	1.94
19.00	1.10	2.20	19.00	0.97	1.94
20.00	1.11	2.22	20.00	0.98	1.96
21.00	1.11	2.22	21.00	0.98	1.96
22.00	1.11	2.22	22.00	0.98	1.96
23.00	1.11	2.22	23.00	0.98	1.96
24.00	1.11	2.22	24.00	0.98	1.96
25.00	1.12	2.24	25.00	0.98	1.96
26.00	1.12	2.24	26.00	0.98	1.96
27.00	1.12	2.24	27.00	0.98	1.96
28.00	1.12	2.24	28.00	0.98	1.96
29.00	1.12	2.24	29.00	0.98	1.96
30.00	1.12	2.24	30.00	0.98	1.96

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	2.122	Y-int (Gm Fluid/Gm Clay)	1.921
Std Err of Y Est	0.007	Std Err of Y Est	0.005
R Squared	0.939	R Squared	0.800
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.004	Slope (Gm Fluid/Gm Clay Min)	0.001
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 48. ENSILIN TEST - STANDARD TEXAS
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.80	1.75	0.25	0.51	1.12
0.50	0.86	1.88	0.50	0.60	1.31
1.00	0.87	1.91	1.00	0.62	1.36
1.50	0.88	1.93	1.50	0.63	1.37
2.00	0.88	1.93	2.00	0.63	1.38
2.50	0.88	1.93	2.50	0.63	1.38
3.00	0.89	1.94	3.00	0.64	1.39
3.50	0.89	1.95	3.50	0.64	1.39
4.00	0.89	1.95	4.00	0.64	1.40
4.50	0.89	1.95	4.50	0.64	1.40
5.00	0.89	1.95	5.00	0.64	1.40
5.50	0.89	1.95	5.50	0.65	1.41
6.00	0.89	1.95	6.00	0.65	1.42
6.50	0.89	1.95	6.50	0.65	1.42
7.00	0.90	1.96	7.00	0.65	1.42
7.50	0.90	1.96	7.50	0.65	1.42
8.00	0.90	1.96	8.00	0.65	1.42
8.50	0.90	1.97	8.50	0.65	1.42
9.00	0.90	1.97	9.00	0.65	1.42
9.50	0.90	1.97	9.50	0.65	1.42
10.00	0.90	1.97	10.00	0.66	1.44
10.50	0.90	1.97	10.50	0.66	1.44
11.00	0.90	1.97	11.00	0.66	1.45
11.50	0.90	1.97	11.50	0.66	1.45
12.00	0.90	1.97	12.00	0.66	1.45
12.50	0.90	1.97	12.50	0.66	1.45
13.00	0.90	1.97	13.00	0.66	1.45
13.50	0.91	1.98	13.50	0.66	1.45
14.00	0.91	1.98	14.00	0.66	1.45
14.50	0.91	1.98	14.50	0.66	1.45
15.00	0.91	1.98	15.00	0.66	1.45
16.00	0.91	1.99	16.00	0.66	1.45
17.00	0.91	1.99	17.00	0.66	1.45
18.00	0.91	1.99	18.00	0.67	1.46
19.00	0.91	1.99	19.00	0.67	1.47
20.00	0.91	1.99	20.00	0.67	1.47
21.00	0.91	1.99	21.00	0.67	1.47
22.00	0.91	1.99	22.00	0.67	1.47
23.00	0.91	1.99	23.00	0.67	1.47
24.00	0.92	2.02	24.00	0.67	1.47
25.00	0.92	2.02	25.00	0.67	1.47
26.00	0.92	2.02	26.00	0.67	1.47
27.00	0.92	2.02	27.00	0.67	1.47
28.00	0.92	2.02	28.00	0.67	1.47
29.00	0.92	2.02	29.00	0.67	1.47
30.00	0.93	2.03	30.00	0.67	1.47

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.940	Y-int (Gm H2O/Gm Clay)	1.409
Std Err of Y Est	0.005	Std Err of Y Est	0.007
R Squared	0.945	R Squared	0.857
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.003	Slope (Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 49. COMPOSITE ENSILIN TEST - STANDARD ARIZONA - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.77	1.54	0.74	1.48	0.58	1.27
0.50	0.81	1.62	0.77	1.54	0.61	1.34
1.00	0.84	1.68	0.79	1.58	0.62	1.36
1.50	0.85	1.70	0.80	1.60	0.63	1.38
2.00	0.86	1.71	0.81	1.62	0.63	1.38
2.50	0.86	1.71	0.82	1.64	0.64	1.40
3.00	0.87	1.73	0.82	1.64	0.64	1.40
3.50	0.87	1.73	0.83	1.65	0.64	1.40
4.00	0.88	1.75	0.83	1.66	0.64	1.40
4.50	0.88	1.75	0.83	1.66	0.64	1.40
5.00	0.89	1.77	0.83	1.66	0.65	1.42
5.50	0.89	1.77	0.83	1.66	0.65	1.42
6.00	0.89	1.77	0.84	1.67	0.65	1.42
6.50	0.90	1.79	0.84	1.68	0.65	1.42
7.00	0.90	1.79	0.84	1.68	0.65	1.42
7.50	0.90	1.79	0.84	1.68	0.65	1.42
8.00	0.91	1.81	0.84	1.68	0.65	1.42
8.50	0.91	1.81	0.84	1.68	0.65	1.42
9.00	0.91	1.81	0.84	1.68	0.65	1.42
9.50	0.91	1.81	0.84	1.68	0.65	1.42
10.00	0.92	1.83	0.84	1.68	0.65	1.42
11.00	0.93	1.85	0.85	1.69	0.65	1.42
12.00	0.93	1.85	0.85	1.70	0.66	1.44
13.00	0.93	1.85	0.85	1.70	0.66	1.45
14.00	0.94	1.87	0.85	1.70	0.66	1.45
15.00	0.95	1.89	0.85	1.70	0.66	1.45
16.00	0.95	1.89	0.86	1.71	0.66	1.45
17.00	0.95	1.89	0.86	1.72	0.66	1.45
18.00	0.96	1.91	0.86	1.72	0.66	1.45
19.00	0.96	1.91	0.86	1.72	0.66	1.45
20.00	0.97	1.93	0.86	1.72	0.66	1.45
21.00	0.97	1.93	0.87	1.73	0.66	1.45
22.00	0.98	1.95	0.87	1.74	0.67	1.46
23.00	0.98	1.95	0.87	1.74	0.67	1.46
24.00	0.99	1.97	0.87	1.74	0.67	1.47
25.00	0.99	1.97	0.87	1.74	0.67	1.47
26.00	1.00	1.99	0.87	1.74	0.67	1.47
27.00	1.00	1.99	0.87	1.74	0.67	1.47
28.00	1.00	1.99	0.87	1.74	0.67	1.47
29.00	1.01	2.01	0.88	1.75	0.67	1.47
30.00	1.01	2.01	0.88	1.75	0.67	1.47

TABLE 50. COMPOSITE ENSILIN TEST - STANDARD
ARIZONA - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.74	1.48	0.71	1.42	0.55	1.21
0.50	0.76	1.52	0.74	1.48	0.56	1.23
1.00	0.78	1.56	0.76	1.52	0.57	1.25
1.50	0.79	1.58	0.77	1.54	0.57	1.25
2.00	0.80	1.60	0.77	1.54	0.58	1.26
2.50	0.80	1.60	0.78	1.55	0.58	1.27
3.00	0.80	1.60	0.78	1.56	0.58	1.27
3.50	0.80	1.60	0.78	1.56	0.58	1.27
4.00	0.81	1.62	0.78	1.56	0.58	1.27
4.50	0.81	1.62	0.78	1.56	0.58	1.27
5.00	0.81	1.62	0.79	1.57	0.58	1.27
5.50	0.81	1.62	0.79	1.57	0.58	1.27
6.00	0.82	1.64	0.79	1.57	0.58	1.27
6.50	0.82	1.64	0.79	1.58	0.58	1.27
7.00	0.82	1.64	0.79	1.58	0.58	1.27
7.50	0.82	1.64	0.79	1.58	0.58	1.27
8.00	0.82	1.64	0.79	1.58	0.58	1.27
8.50	0.82	1.64	0.79	1.58	0.58	1.27
9.00	0.82	1.64	0.79	1.58	0.58	1.27
9.50	0.82	1.64	0.79	1.58	0.58	1.27
10.00	0.83	1.66	0.79	1.58	0.58	1.27
11.00	0.83	1.66	0.79	1.58	0.59	1.28
12.00	0.83	1.66	0.79	1.58	0.59	1.28
13.00	0.83	1.66	0.80	1.59	0.59	1.28
14.00	0.83	1.66	0.80	1.60	0.59	1.29
15.00	0.83	1.66	0.80	1.60	0.59	1.29
16.00	0.83	1.66	0.80	1.60	0.59	1.29
17.00	0.83	1.66	0.80	1.60	0.59	1.29
18.00	0.83	1.66	0.80	1.60	0.59	1.29
19.00	0.83	1.66	0.80	1.60	0.59	1.29
20.00	0.84	1.68	0.80	1.60	0.59	1.29
21.00	0.84	1.68	0.80	1.60	0.59	1.29
22.00	0.84	1.68	0.80	1.60	0.59	1.29
23.00	0.84	1.68	0.80	1.60	0.59	1.29
24.00	0.84	1.68	0.80	1.60	0.59	1.29
25.00	0.84	1.68	0.80	1.60	0.59	1.29
26.00	0.84	1.68	0.80	1.60	0.59	1.29
27.00	0.84	1.68	0.80	1.60	0.59	1.29
28.00	0.84	1.68	0.81	1.61	0.59	1.29
29.00	0.85	1.70	0.81	1.61	0.59	1.29
30.00	0.85	1.70	0.81	1.61	0.59	1.29

TABLE 51. ENSILIN TEST - STANDARD ARIZONA
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.77	1.54	0.25	0.74	1.48
0.50	0.81	1.62	0.50	0.76	1.52
1.00	0.84	1.68	1.00	0.78	1.56
1.50	0.85	1.70	1.50	0.79	1.58
2.00	0.86	1.71	2.00	0.80	1.60
2.50	0.86	1.71	2.50	0.80	1.60
3.00	0.87	1.73	3.00	0.80	1.60
3.50	0.87	1.73	3.50	0.80	1.60
4.00	0.88	1.75	4.00	0.81	1.62
4.50	0.88	1.75	4.50	0.81	1.62
5.00	0.89	1.77	5.00	0.81	1.62
5.50	0.89	1.77	5.50	0.81	1.62
6.00	0.89	1.77	6.00	0.82	1.64
6.50	0.90	1.79	6.50	0.82	1.64
7.00	0.90	1.79	7.00	0.82	1.64
7.50	0.90	1.79	7.50	0.82	1.64
8.00	0.91	1.81	8.00	0.82	1.64
8.50	0.91	1.81	8.50	0.82	1.64
9.00	0.91	1.81	9.00	0.82	1.64
9.50	0.91	1.81	9.50	0.82	1.64
10.00	0.92	1.83	10.00	0.83	1.66
11.00	0.93	1.85	11.00	0.83	1.66
12.00	0.93	1.85	12.00	0.83	1.66
13.00	0.93	1.85	13.00	0.83	1.66
14.00	0.94	1.87	14.00	0.83	1.66
15.00	0.95	1.89	15.00	0.83	1.66
16.00	0.95	1.89	16.00	0.83	1.66
17.00	0.95	1.89	17.00	0.83	1.66
18.00	0.96	1.91	18.00	0.83	1.66
19.00	0.96	1.91	19.00	0.83	1.66
20.00	0.97	1.93	20.00	0.84	1.68
21.00	0.97	1.93	21.00	0.84	1.68
22.00	0.98	1.95	22.00	0.84	1.68
23.00	0.98	1.95	23.00	0.84	1.68
24.00	0.99	1.97	24.00	0.84	1.68
25.00	0.99	1.97	25.00	0.84	1.68
26.00	1.00	1.99	26.00	0.84	1.68
27.00	1.00	1.99	27.00	0.84	1.68
28.00	1.00	1.99	28.00	0.84	1.68
29.00	1.01	2.01	29.00	0.85	1.70
30.00	1.01	2.01	30.00	0.85	1.70

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.729	Y-int (Gm H2O/Gm Clay)	1.616
Std Err of Y Est	0.008	Std Err of Y Est	0.007
R Squared	0.990	R Squared	0.886
No. of Observations	31.000	No. of Observations	31.000
Degrees of Freedom	29.000	Degrees of Freedom	29.000
Slope		Slope	
(Gm Fluid/Gm Clay Min)	0.010	(Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 52. ENSILIN TEST - STANDARD ARIZONA
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.74	1.48	0.25	0.71	1.42
0.50	0.77	1.54	0.50	0.74	1.48
1.00	0.79	1.57	1.00	0.76	1.52
1.50	0.80	1.60	1.50	0.77	1.54
2.00	0.81	1.62	2.00	0.77	1.54
2.50	0.82	1.64	2.50	0.78	1.55
3.00	0.82	1.64	3.00	0.78	1.56
3.50	0.83	1.65	3.50	0.78	1.56
4.00	0.83	1.66	4.00	0.78	1.56
4.50	0.83	1.66	4.50	0.78	1.56
5.00	0.83	1.66	5.00	0.79	1.57
5.50	0.83	1.66	5.50	0.79	1.57
6.00	0.84	1.67	6.00	0.79	1.57
6.50	0.84	1.68	6.50	0.79	1.58
7.00	0.84	1.68	7.00	0.79	1.58
7.50	0.84	1.68	7.50	0.79	1.58
8.00	0.84	1.68	8.00	0.79	1.58
8.50	0.84	1.68	8.50	0.79	1.58
9.00	0.84	1.68	9.00	0.79	1.58
9.50	0.84	1.68	9.50	0.79	1.58
10.00	0.84	1.68	10.00	0.79	1.58
10.50	0.84	1.68	10.50	0.79	1.58
11.00	0.85	1.69	11.00	0.79	1.58
11.50	0.85	1.70	11.50	0.79	1.58
12.00	0.85	1.70	12.00	0.79	1.58
12.50	0.85	1.70	12.50	0.80	1.59
13.00	0.85	1.70	13.00	0.80	1.59
13.50	0.85	1.70	13.50	0.80	1.59
14.00	0.85	1.70	14.00	0.80	1.60
14.50	0.85	1.70	14.50	0.80	1.60
15.00	0.85	1.70	15.00	0.80	1.60
16.00	0.86	1.71	16.00	0.80	1.60
17.00	0.86	1.71	17.00	0.80	1.60
18.00	0.86	1.71	18.00	0.80	1.60
19.00	0.86	1.71	19.00	0.80	1.60
20.00	0.86	1.71	20.00	0.80	1.60
21.00	0.87	1.72	21.00	0.80	1.60
22.00	0.87	1.73	22.00	0.80	1.60
23.00	0.87	1.73	23.00	0.80	1.60
24.00	0.87	1.73	24.00	0.80	1.60
25.00	0.87	1.73	25.00	0.80	1.60
26.00	0.87	1.73	26.00	0.80	1.60
27.00	0.87	1.73	27.00	0.80	1.60
28.00	0.87	1.73	28.00	0.81	1.61
29.00	0.88	1.74	29.00	0.81	1.61
30.00	0.88	1.74	30.00	0.81	1.61

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.651	Y-int (Gm H2O/Gm Clay)	1.569
Std Err of Y Est	0.006	Std Err of Y Est	0.005
R Squared	0.935	R Squared	0.684
No. of Observations	26.000	No. of Observations	26.000
Degrees of Freedom	24.000	Degrees of Freedom	24.000
Slope (Gm Fluid/Gm Clay Min)	0.003	Slope (Gm Fluid/Gm Clay Min)	0.001
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 53. ENSILIN TEST - STANDARD ARIZONA
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.58	1.27	0.25	0.55	1.21
0.50	0.61	1.34	0.50	0.56	1.23
1.00	0.62	1.36	1.00	0.57	1.25
1.50	0.63	1.38	1.50	0.57	1.25
2.00	0.63	1.38	2.00	0.58	1.26
2.50	0.64	1.40	2.50	0.58	1.27
3.00	0.64	1.40	3.00	0.58	1.27
3.50	0.64	1.40	3.50	0.58	1.27
4.00	0.64	1.40	4.00	0.58	1.27
4.50	0.64	1.40	4.50	0.58	1.27
5.00	0.65	1.42	5.00	0.58	1.27
5.50	0.65	1.42	5.50	0.58	1.27
6.00	0.65	1.42	6.00	0.58	1.27
6.50	0.65	1.42	6.50	0.58	1.27
7.00	0.65	1.42	7.00	0.58	1.27
7.50	0.65	1.42	7.50	0.58	1.27
8.00	0.65	1.42	8.00	0.58	1.27
8.50	0.65	1.42	8.50	0.58	1.27
9.00	0.65	1.42	9.00	0.58	1.27
9.50	0.65	1.42	9.50	0.58	1.27
10.00	0.65	1.42	10.00	0.58	1.27
10.50	0.65	1.42	10.50	0.58	1.27
11.00	0.65	1.42	11.00	0.59	1.28
11.50	0.65	1.42	11.50	0.59	1.28
12.00	0.66	1.44	12.00	0.59	1.28
12.50	0.66	1.45	12.50	0.59	1.28
13.00	0.66	1.45	13.00	0.59	1.28
13.50	0.66	1.45	13.50	0.59	1.29
14.00	0.66	1.45	14.00	0.59	1.29
14.50	0.66	1.45	14.50	0.59	1.29
15.00	0.66	1.45	15.00	0.59	1.29
16.00	0.66	1.45	16.00	0.59	1.29
17.00	0.66	1.45	17.00	0.59	1.29
18.00	0.66	1.45	18.00	0.59	1.29
19.00	0.66	1.45	19.00	0.59	1.29
20.00	0.66	1.45	20.00	0.59	1.29
21.00	0.66	1.45	21.00	0.59	1.29
22.00	0.67	1.46	22.00	0.59	1.29
23.00	0.67	1.46	23.00	0.59	1.29
24.00	0.67	1.47	24.00	0.59	1.29
25.00	0.67	1.47	25.00	0.59	1.29
26.00	0.67	1.47	26.00	0.59	1.29
27.00	0.67	1.47	27.00	0.59	1.29
28.00	0.67	1.47	28.00	0.59	1.29
29.00	0.67	1.47	29.00	0.59	1.29
30.00	0.67	1.47	30.00	0.59	1.29

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	1.409	Y-int (Gm H2O/Gm Clay)	1.267
Std Err of Y Est	0.005	Std Err of Y Est	0.006
R Squared	0.901	R Squared	0.699
No. of Observations	36.000	No. of Observations	36.000
Degrees of Freedom	34.000	Degrees of Freedom	34.000
Slope (Gm Fluid/Gm Clay Min)	0.002	Slope (Gm Fluid/Gm Clay Min)	0.001
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 54. COMPOSITE ENSILIN TEST - STANDARD WYOMING - HGF APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.31	0.62	0.19	0.38	0.07	0.15
0.50	0.43	0.86	0.21	0.42	0.07	0.15
1.00	0.60	1.20	0.23	0.46	0.07	0.15
1.50	0.73	1.46	0.27	0.54	0.08	0.18
2.00	0.83	1.66	0.29	0.58	0.08	0.18
2.50	0.91	1.81	0.31	0.62	0.08	0.18
3.00	0.98	1.95	0.32	0.64	0.08	0.18
3.50	1.05	2.09	0.33	0.66	0.08	0.18
4.00	1.11	2.21	0.34	0.68	0.08	0.18
4.50	1.16	2.31	0.35	0.70	0.08	0.18
5.00	1.22	2.43	0.36	0.72	0.08	0.18
5.50	1.27	2.53	0.36	0.72	0.08	0.18
6.00	1.32	2.63	0.37	0.73	0.08	0.18
6.50	1.36	2.71	0.37	0.74	0.08	0.18
7.00	1.40	2.79	0.37	0.74	0.09	0.19
7.50	1.44	2.87	0.37	0.74	0.09	0.20
8.00	1.47	2.93	0.37	0.74	0.09	0.20
8.50	1.51	3.01	0.37	0.74	0.09	0.20
9.00	1.54	3.07	0.37	0.74	0.09	0.20
9.50	1.58	3.15	0.38	0.76	0.09	0.20
10.00	1.61	3.21	0.38	0.76	0.09	0.20
11.00	1.68	3.35	0.38	0.76	0.09	0.20
12.00	1.74	3.47	0.38	0.76	0.09	0.20
13.00	1.80	3.59	0.39	0.77	0.09	0.20
14.00	1.85	3.69	0.39	0.77	0.09	0.20
15.00	1.90	3.79	0.39	0.78	0.09	0.20
16.00	1.95	3.89	0.39	0.78	0.09	0.20
17.00	2.00	3.99	0.39	0.78	0.09	0.20
18.00	2.05	4.09	0.40	0.79	0.09	0.20
19.00	2.11	4.21	0.40	0.79	0.09	0.20
20.00	2.16	4.31	0.40	0.80	0.09	0.20
21.00	2.22	4.43	0.40	0.80	0.09	0.20
22.00	2.25	4.49	0.40	0.80	0.09	0.20
23.00	2.29	4.57	0.40	0.80	0.10	0.22
24.00	2.33	4.65	0.40	0.80	0.10	0.22
25.00	2.37	4.73	0.40	0.80	0.10	0.22
26.00	2.41	4.81	0.40	0.80	0.11	0.23
27.00	2.45	4.89	0.40	0.80	0.11	0.23
28.00	2.49	4.97	0.40	0.80	0.11	0.23
29.00	2.52	5.03	0.40	0.80	0.11	0.23
30.00	2.55	5.09	0.40	0.80	0.11	0.23
35.00	2.70	5.38				
40.00	2.84	5.66				
45.00	2.95	5.88				
50.00	3.05	6.08				
55.00	3.15	6.28				
60.00	3.24	6.46				
70.00	3.39	6.76				
80.00	3.55	7.08				
90.00	3.68	7.34				
100.00	3.80	7.58				
110.00	3.92	7.82				
120.00	4.05	8.08				
150.00	4.35	8.67				
180.00	4.61	9.19				
210.00	4.83	9.63				
480.00	6.34	12.64				
1,150.00	7.89	15.73				
1,165.00	7.91	15.77				
1,180.00	7.94	15.83				
1,195.00	7.97	15.89				
1,200.00	7.98	15.91				
1,230.00	8.03	16.01				
1,300.00	8.09	16.13				
1,333.00	8.19	16.33				

TABLE 55. COMPOSITE ENSILIN TEST - STANDARD WYOMING - SGI APPARATUS

TIME (MINUTES)	TEST FLUID 0% KCL/H2O		TEST FLUID 0.5% KCL/H2O		TEST FLUID 15% KCL/H2O	
	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY	FLUID ADS. (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.26	0.52	0.19	1.90	0.06	0.66
0.50	0.37	0.74	0.24	2.40	0.07	0.77
1.00	0.52	1.04	0.28	2.80	0.08	0.88
1.50	0.62	1.24	0.30	3.00	0.09	0.93
2.00	0.69	1.38	0.31	3.10	0.09	0.99
2.50	0.75	1.50	0.32	3.20	0.09	0.99
3.00	0.79	1.58	0.33	3.30	0.09	0.99
3.50	0.84	1.68	0.33	3.30	0.09	0.99
4.00	0.88	1.75	0.34	3.35	0.09	0.99
4.50	0.91	1.81	0.34	3.40	0.09	0.99
5.00	0.94	1.87	0.34	3.40	0.09	0.99
5.50	0.97	1.93	0.35	3.45	0.09	0.99
6.00	1.00	1.99	0.35	3.45	0.09	0.99
6.50	1.03	2.05	0.35	3.50	0.09	0.99
7.00	1.06	2.11	0.35	3.50	0.09	0.99
7.50	1.08	2.15	0.35	3.50	0.09	0.99
8.00	1.11	2.21	0.35	3.50	0.10	1.04
8.50	1.13	2.25	0.35	3.50	0.10	1.04
9.00	1.15	2.29	0.35	3.50	0.10	1.04
9.50	1.17	2.33	0.35	3.50	0.10	1.10
10.00	1.19	2.37	0.36	3.55	0.10	1.10
11.00	1.23	2.45	0.36	3.60	0.10	1.10
12.00	1.27	2.53	0.36	3.60	0.10	1.10
13.00	1.31	2.61	0.36	3.60	0.10	1.10
14.00	1.34	2.67	0.36	3.60	0.10	1.10
15.00	1.37	2.73	0.36	3.60	0.10	1.10
16.00	1.40	2.79	0.36	3.60	0.10	1.10
17.00	1.44	2.87	0.36	3.60	0.10	1.10
18.00	1.46	2.91	0.36	3.60	0.10	1.10
19.00	1.49	2.97	0.36	3.60	0.10	1.10
20.00	1.52	3.03	0.37	3.65	0.10	1.10
21.00	1.55	3.09	0.37	3.65	0.11	1.15
22.00	1.57	3.13	0.37	3.70	0.11	1.15
23.00	1.60	3.19	0.37	3.70	0.11	1.15
24.00	1.62	3.23	0.37	3.70	0.11	1.15
25.00	1.64	3.27	0.37	3.70	0.11	1.21
26.00	1.67	3.33	0.37	3.70	0.11	1.21
27.00	1.69	3.37	0.37	3.70	0.11	1.21
28.00	1.72	3.43	0.37	3.70	0.11	1.21
29.00	1.74	3.47	0.37	3.70	0.11	1.21
30.00	1.75	3.49	0.37	3.70	0.11	1.21
35.00	1.88	3.75				
40.00	2.00	3.99				
45.00	2.11	4.21				
50.00	2.21	4.41				
55.00	2.31	4.61				
60.00	2.37	4.73				
70.00	2.52	5.03				
80.00	2.66	5.30				
90.00	2.77	5.52				
100.00	2.89	5.76				
110.00	2.99	5.96				
120.00	3.10	6.18				
150.00	3.33	6.64				
180.00	3.52	7.02				
210.00	3.75	7.48				
480.00	4.66	9.29				
1,150.00	5.57	11.11				
1,165.00	5.58	11.13				
1,180.00	5.59	11.15				
1,195.00	5.60	11.17				
1,200.00	5.61	11.19				
1,230.00	5.63	11.23				
1,300.00	5.65	11.27				
1,333.00	5.68	11.33				

TABLE 56. ENSILIN TEST - STANDARD WYOMING
0% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.31	0.62	0.25	0.26	0.52
0.50	0.43	0.86	0.50	0.37	0.74
1.00	0.60	1.20	1.00	0.52	1.04
1.50	0.73	1.46	1.50	0.62	1.24
2.00	0.83	1.66	2.00	0.69	1.38
2.50	0.91	1.81	2.50	0.75	1.50
3.00	0.98	1.95	3.00	0.79	1.58
3.50	1.05	2.09	3.50	0.84	1.68
4.00	1.11	2.21	4.00	0.88	1.75
4.50	1.16	2.31	4.50	0.91	1.81
5.00	1.22	2.43	5.00	0.94	1.87
5.50	1.27	2.53	5.50	0.97	1.93
6.00	1.32	2.63	6.00	1.00	1.99
6.50	1.36	2.71	6.50	1.03	2.05
7.00	1.40	2.79	7.00	1.06	2.11
7.50	1.44	2.87	7.50	1.08	2.15
8.00	1.47	2.93	8.00	1.11	2.21
8.50	1.51	3.01	8.50	1.13	2.25
9.00	1.54	3.07	9.00	1.15	2.29
9.50	1.58	3.15	9.50	1.17	2.33
10.00	1.61	3.21	10.00	1.19	2.37
11.00	1.68	3.35	11.00	1.23	2.45
12.00	1.74	3.47	12.00	1.27	2.53
13.00	1.80	3.59	13.00	1.31	2.61
14.00	1.85	3.69	14.00	1.34	2.67
15.00	1.90	3.79	15.00	1.37	2.73
16.00	1.95	3.89	16.00	1.40	2.79
17.00	2.00	3.99	17.00	1.44	2.87
18.00	2.05	4.09	18.00	1.46	2.91
19.00	2.11	4.21	19.00	1.49	2.97
20.00	2.16	4.31	20.00	1.52	3.03
21.00	2.22	4.43	21.00	1.55	3.09
22.00	2.25	4.49	22.00	1.57	3.13
23.00	2.29	4.57	23.00	1.60	3.19
24.00	2.33	4.65	24.00	1.62	3.23
25.00	2.37	4.73	25.00	1.64	3.27
26.00	2.41	4.81	26.00	1.67	3.33
27.00	2.45	4.89	27.00	1.69	3.37
28.00	2.49	4.97	28.00	1.72	3.43
29.00	2.52	5.03	29.00	1.74	3.47
30.00	2.55	5.09	30.00	1.75	3.49
35.00	2.70	5.38	35.00	1.88	3.75
40.00	2.84	5.66	40.00	2.00	3.99
45.00	2.95	5.88	45.00	2.11	4.21
50.00	3.05	6.08	50.00	2.21	4.41
55.00	3.15	6.28	55.00	2.31	4.61
60.00	3.24	6.46	60.00	2.37	4.73
70.00	3.39	6.76	70.00	2.52	5.03
80.00	3.55	7.08	80.00	2.66	5.30
90.00	3.68	7.34	90.00	2.77	5.52
100.00	3.80	7.58	100.00	2.89	5.76
110.00	3.92	7.82	110.00	2.99	5.96
120.00	4.05	8.08	120.00	3.10	6.18
150.00	4.35	8.67	150.00	3.33	6.64
180.00	4.61	9.19	180.00	3.52	7.02
210.00	4.83	9.63	210.00	3.75	7.48
480.00	6.34	12.64	480.00	4.66	9.29
1,150.00	7.89	15.73	1,150.00	5.57	11.11
1,165.00	7.91	15.77	1,165.00	5.58	11.13
1,180.00	7.94	15.83	1,180.00	5.59	11.15
1,195.00	7.97	15.89	1,195.00	5.60	11.17
1,200.00	7.98	15.91	1,200.00	5.61	11.19
1,230.00	8.03	16.01	1,230.00	5.63	11.23
1,300.00	8.09	16.13	1,300.00	5.65	11.27
1,333.00	8.19	16.33	1,333.00	5.68	11.33

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	10.589	Y-int (Gm H2O/Gm Clay)	8.153
Std Err of Y Est	0.098	Std Err of Y Est	0.093
R Squared	0.993	R Squared	0.982
No. of Observations	9.000	No. of Observations	9.000
Degrees of Freedom	7.000	Degrees of Freedom	7.000
Slope (Gm Fluid/Gm Clay Min)	0.004	Slope (Gm Fluid/Gm Clay Min)	0.002
Std Err of Slope	0.000	Std Err of Slope	0.000

TABLE 57. ENSILIN TEST - STANDARD WYOMING
0.5% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.19	1.90	0.25	0.19	1.90
0.50	0.21	2.10	0.50	0.24	2.40
1.00	0.23	2.30	1.00	0.28	2.80
1.50	0.27	2.70	1.50	0.30	3.00
2.00	0.29	2.90	2.00	0.31	3.10
2.50	0.31	3.10	2.50	0.32	3.20
3.00	0.32	3.20	3.00	0.33	3.30
3.50	0.33	3.30	3.50	0.33	3.30
4.00	0.34	3.40	4.00	0.34	3.35
4.50	0.35	3.50	4.50	0.34	3.40
5.00	0.36	3.60	5.00	0.34	3.40
5.50	0.36	3.60	5.50	0.35	3.45
6.00	0.37	3.65	6.00	0.35	3.45
6.50	0.37	3.70	6.50	0.35	3.50
7.00	0.37	3.70	7.00	0.35	3.50
7.50	0.37	3.70	7.50	0.35	3.50
8.00	0.37	3.70	8.00	0.35	3.50
8.50	0.37	3.70	8.50	0.35	3.50
9.00	0.37	3.70	9.00	0.35	3.50
9.50	0.38	3.80	9.50	0.35	3.50
10.00	0.38	3.80	10.00	0.36	3.55
10.50	0.38	3.80	10.50	0.36	3.60
11.00	0.38	3.80	11.00	0.36	3.60
11.50	0.38	3.80	11.50	0.36	3.60
12.00	0.38	3.80	12.00	0.36	3.60
12.50	0.39	3.85	12.50	0.36	3.60
13.00	0.39	3.85	13.00	0.36	3.60
13.50	0.39	3.85	13.50	0.36	3.60
14.00	0.39	3.85	14.00	0.36	3.60
14.50	0.39	3.85	14.50	0.36	3.60
15.00	0.39	3.90	15.00	0.36	3.60
16.00	0.39	3.90	16.00	0.36	3.60
17.00	0.39	3.90	17.00	0.36	3.60
18.00	0.40	3.95	18.00	0.36	3.60
19.00	0.40	3.95	19.00	0.36	3.60
20.00	0.40	4.00	20.00	0.37	3.65
21.00	0.40	4.00	21.00	0.37	3.65
22.00	0.40	4.00	22.00	0.37	3.70
23.00	0.40	4.00	23.00	0.37	3.70
24.00	0.40	4.00	24.00	0.37	3.70
25.00	0.40	4.00	25.00	0.37	3.70
26.00	0.40	4.00	26.00	0.37	3.70
27.00	0.40	4.00	27.00	0.37	3.70
28.00	0.40	4.00	28.00	0.37	3.70
29.00	0.40	4.00	29.00	0.37	3.70
30.00	0.40	4.00	30.00	0.37	3.70

Regression Output:		Regression Output:	
Y-int (Gm Fluid/Gm Clay)	3.698	Y-int (Gm H2O/Gm Clay)	3.508
Std Err of Y Est	0.032	Std Err of Y Est	0.020
R Squared	0.849	R Squared	0.838
No. of Observations	25.000	No. of Observations	25.000
Degrees of Freedom	23.000	Degrees of Freedom	23.000
Slope (Gm Fluid/Gm Clay Min)	0.012	Slope (Gm Fluid/Gm Clay Min)	0.007
Std Err of Slope	0.001	Std Err of Slope	0.001

TABLE 58. ENSILIN TEST - STANDARD WYOMING
15% KCl/H2O

HGF APPARATUS			SGI APPARATUS		
TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY	TIME (MINUTES)	FLUID ADSORBED (ML)	GM FLUID/ GM CLAY
0.00	0.00	0.00	0.00	0.00	0.00
0.25	0.07	0.77	0.25	0.06	0.66
0.50	0.07	0.77	0.50	0.07	0.77
1.00	0.07	0.77	1.00	0.08	0.88
1.50	0.08	0.88	1.50	0.09	0.93
2.00	0.08	0.88	2.00	0.09	0.99
2.50	0.08	0.88	2.50	0.09	0.99
3.00	0.08	0.88	3.00	0.09	0.99
3.50	0.08	0.88	3.50	0.09	0.99
4.00	0.08	0.88	4.00	0.09	0.99
4.50	0.08	0.88	4.50	0.09	0.99
5.00	0.08	0.88	5.00	0.09	0.99
5.50	0.08	0.88	5.50	0.09	0.99
6.00	0.08	0.88	6.00	0.09	0.99
6.50	0.08	0.88	6.50	0.09	0.99
7.00	0.09	0.93	7.00	0.09	0.99
7.50	0.09	0.99	7.50	0.09	0.99
8.00	0.09	0.99	8.00	0.10	1.04
8.50	0.09	0.99	8.50	0.10	1.04
9.00	0.09	0.99	9.00	0.10	1.04
9.50	0.09	0.99	9.50	0.10	1.10
10.00	0.09	0.99	10.00	0.10	1.10
11.00	0.09	0.99	11.00	0.10	1.10
12.00	0.09	0.99	12.00	0.10	1.10
13.00	0.09	0.99	13.00	0.10	1.10
14.00	0.09	0.99	14.00	0.10	1.10
15.00	0.09	0.99	15.00	0.10	1.10
16.00	0.09	0.99	16.00	0.10	1.10
17.00	0.09	0.99	17.00	0.10	1.10
18.00	0.09	0.99	18.00	0.10	1.10
19.00	0.09	0.99	19.00	0.10	1.10
20.00	0.09	0.99	20.00	0.10	1.10
21.00	0.09	0.99	21.00	0.11	1.15
22.00	0.09	0.99	22.00	0.11	1.15
23.00	0.10	1.10	23.00	0.11	1.15
24.00	0.10	1.10	24.00	0.11	1.15
25.00	0.10	1.10	25.00	0.11	1.21
26.00	0.11	1.15	26.00	0.11	1.21
27.00	0.11	1.15	27.00	0.11	1.21
28.00	0.11	1.15	28.00	0.11	1.21
29.00	0.11	1.15	29.00	0.11	1.21
30.00	0.11	1.15	30.00	0.11	1.21

Regression Output:

Y-int (Gm Fluid/Gm Clay)	0.860
Std Err of Y Est	0.040
R Squared	0.782
No. of Observations	31.000
Degrees of Freedom	29.000
Slope (Gm Fluid/Gm Clay Min)	0.009
Std Err of Slope	0.001

Regression Output:

Y-int (Gm H2O/Gm Clay)	0.958
Std Err of Y Est	0.025
R Squared	0.886
No. of Observations	31.000
Degrees of Freedom	29.000
Slope (Gm Fluid/Gm Clay Min)	0.009
Std Err of Slope	0.001

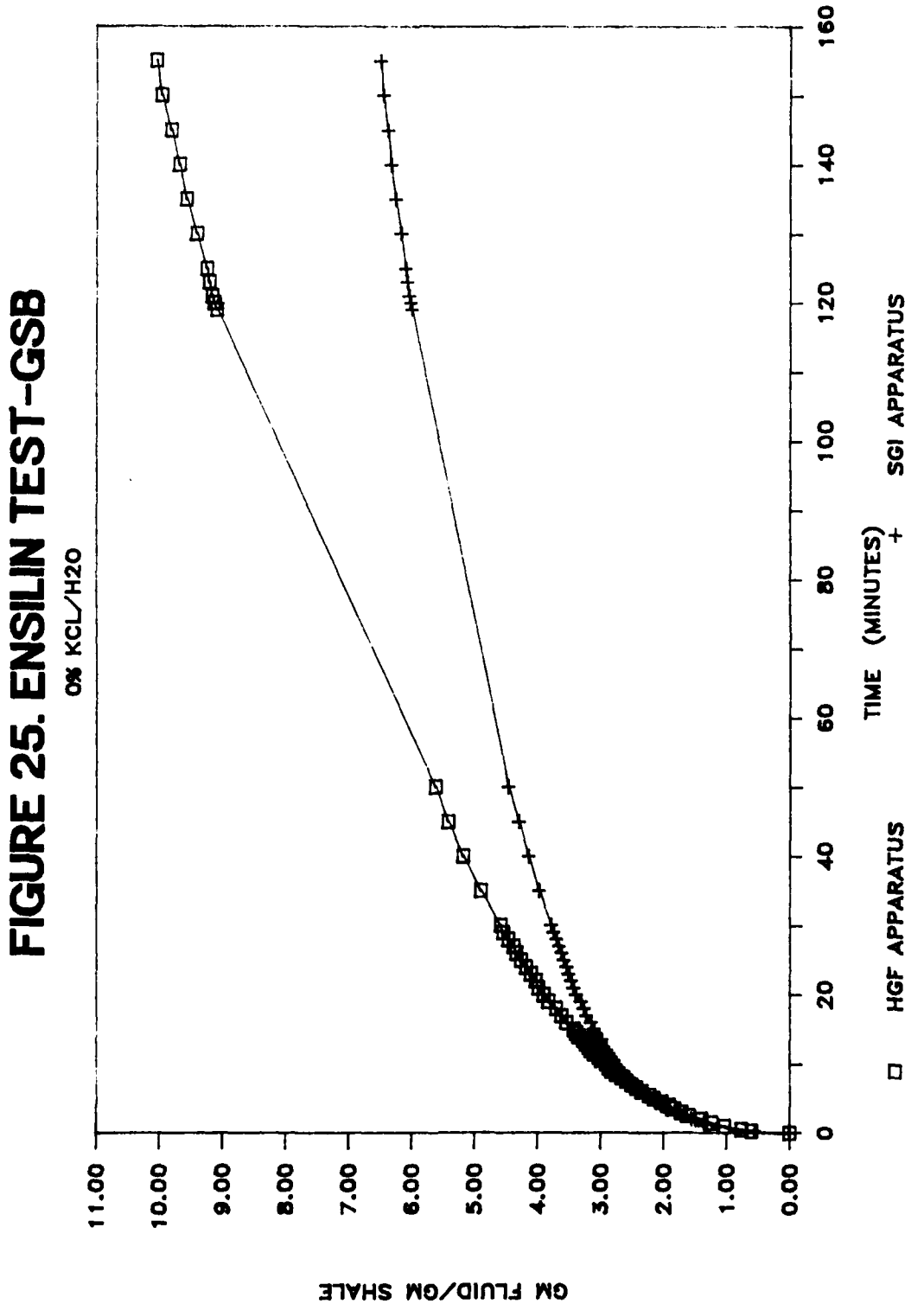
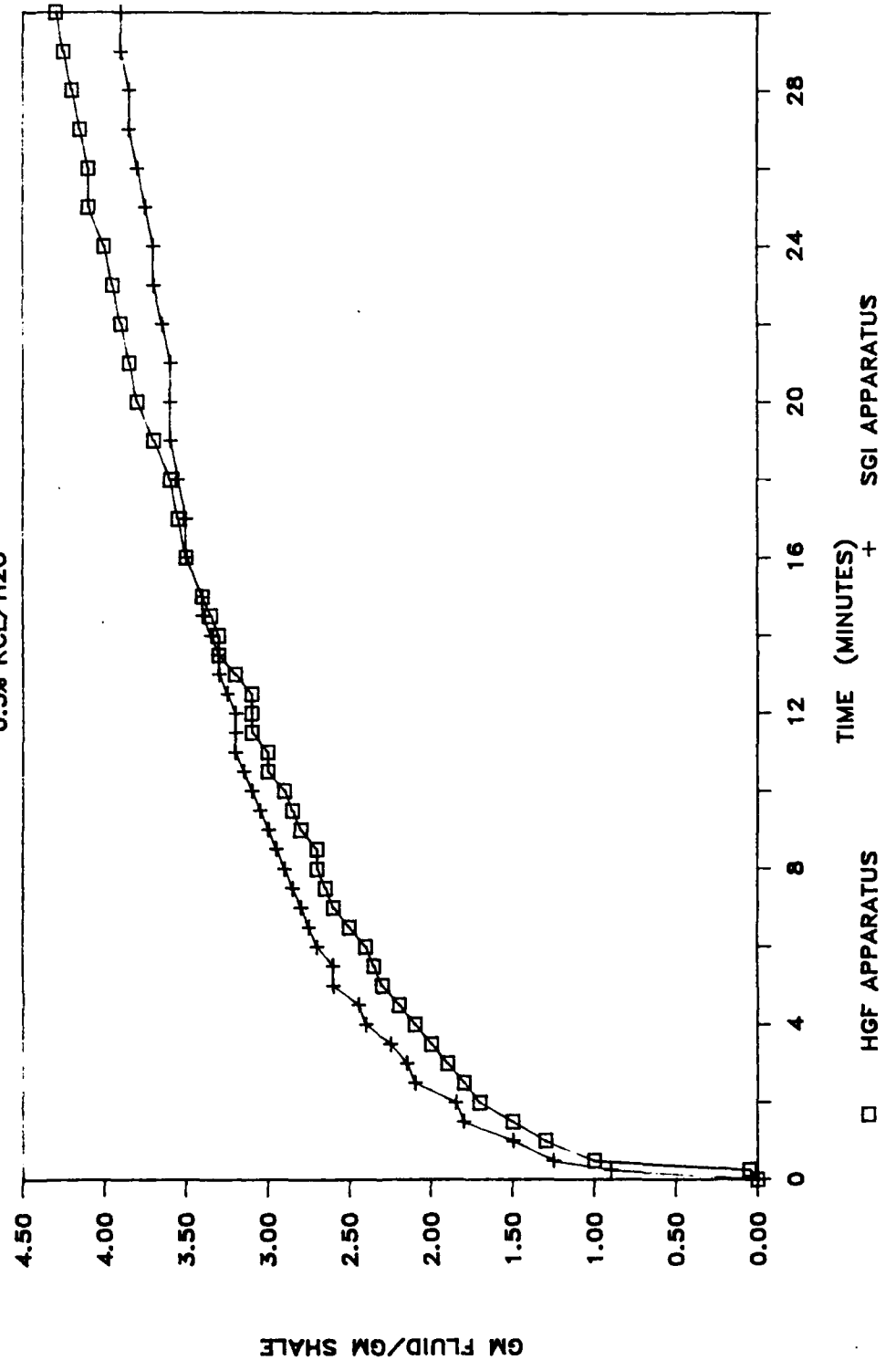


FIGURE 25. ENSILIN TEST-GSB
0% KCL/H2O
GM FLUID/GM SHALE
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0
20
40
60
80
100
120
140
160
TIME (MINUTES)
HGF APPARATUS
SGI APPARATUS

FIGURE 26. ENSILIN TEST-GSB



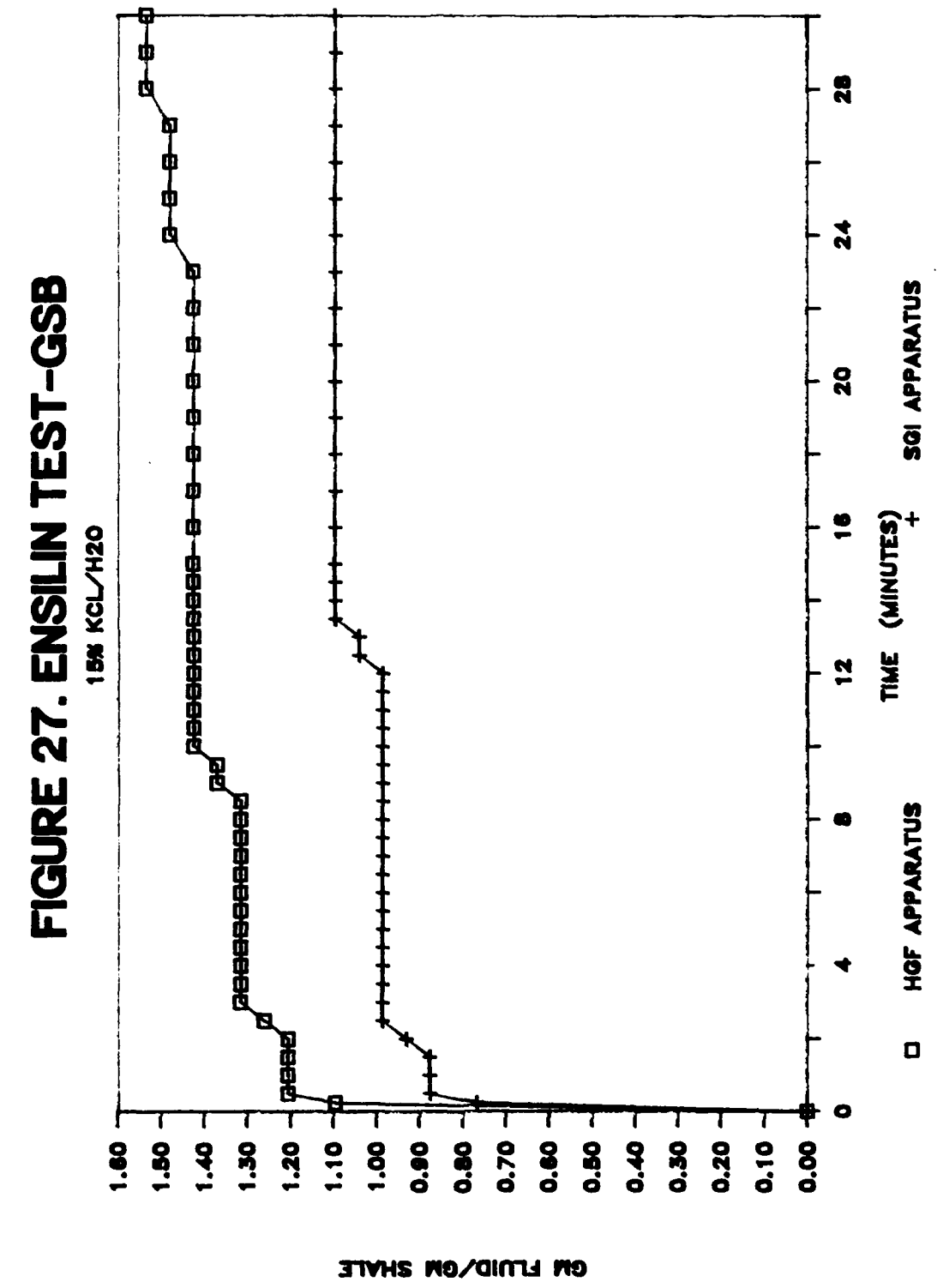


FIGURE 27. ENSILIN TEST-GSB
15% KCL/H2O
GM FLUID/GM SHALE
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
4
8
12
16
20
24
28
TIME (MINUTES)
HGF APPARATUS
SGI APPARATUS

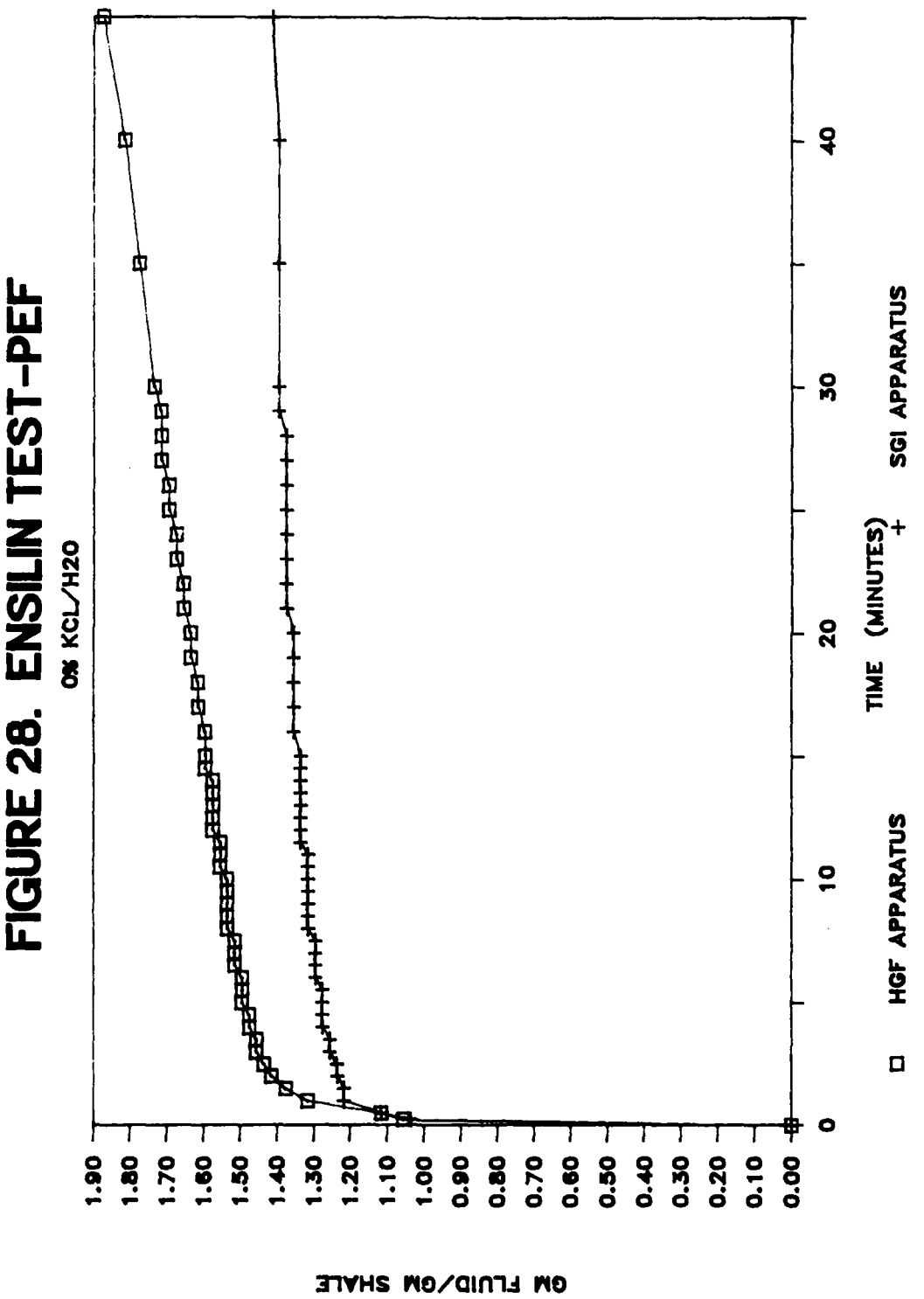


FIGURE 28. ENSILIN TEST-PEF
0% KCL/H20
GM FLUID/GM SHALE
1.90
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
10
20
30
40
TIME (MINUTES)
HGF APPARATUS
SGI APPARATUS

FIGURE 29. ENSILIN TEST-PEF

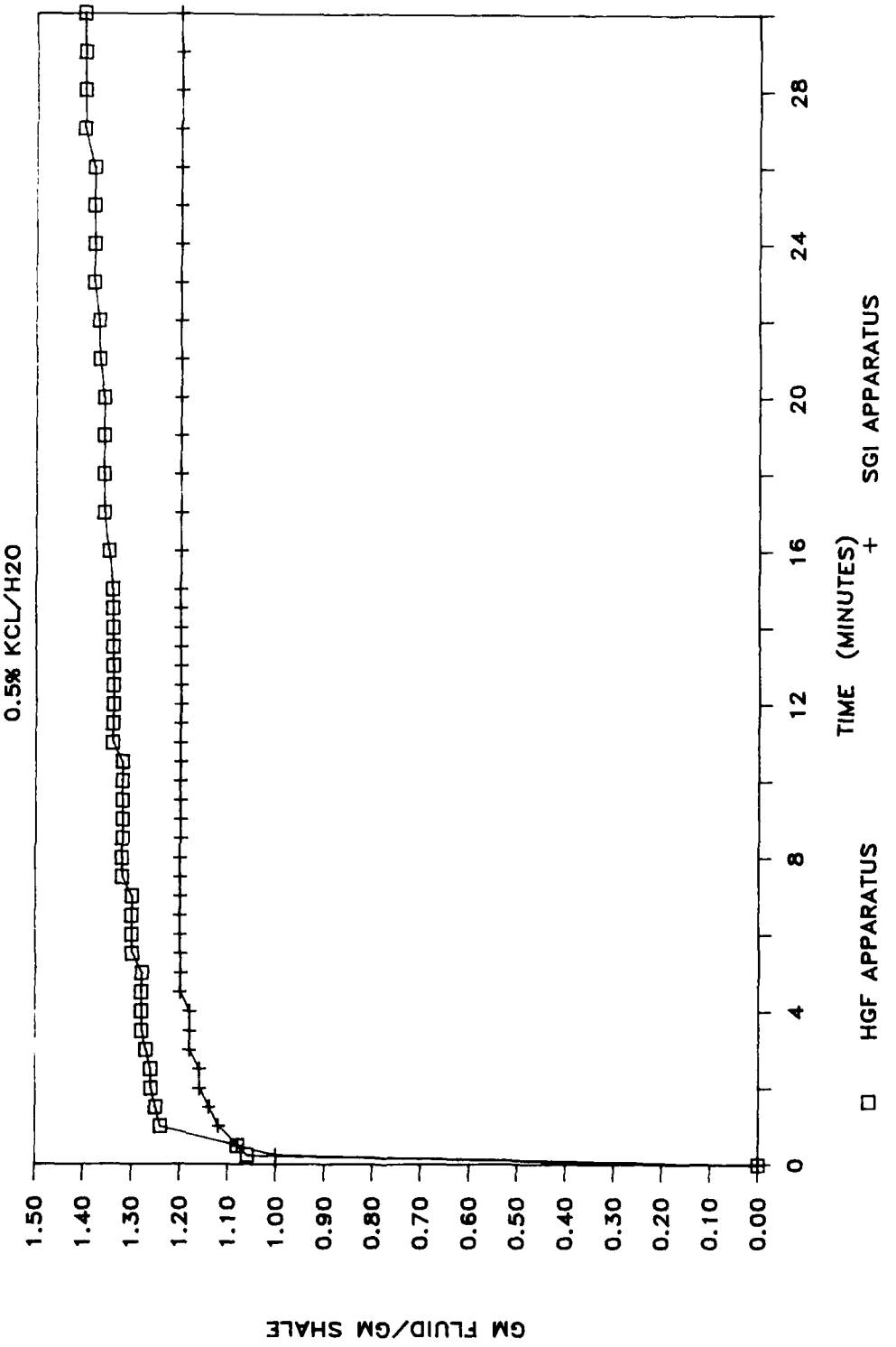


FIGURE 30. ENSILIN TEST-PEF

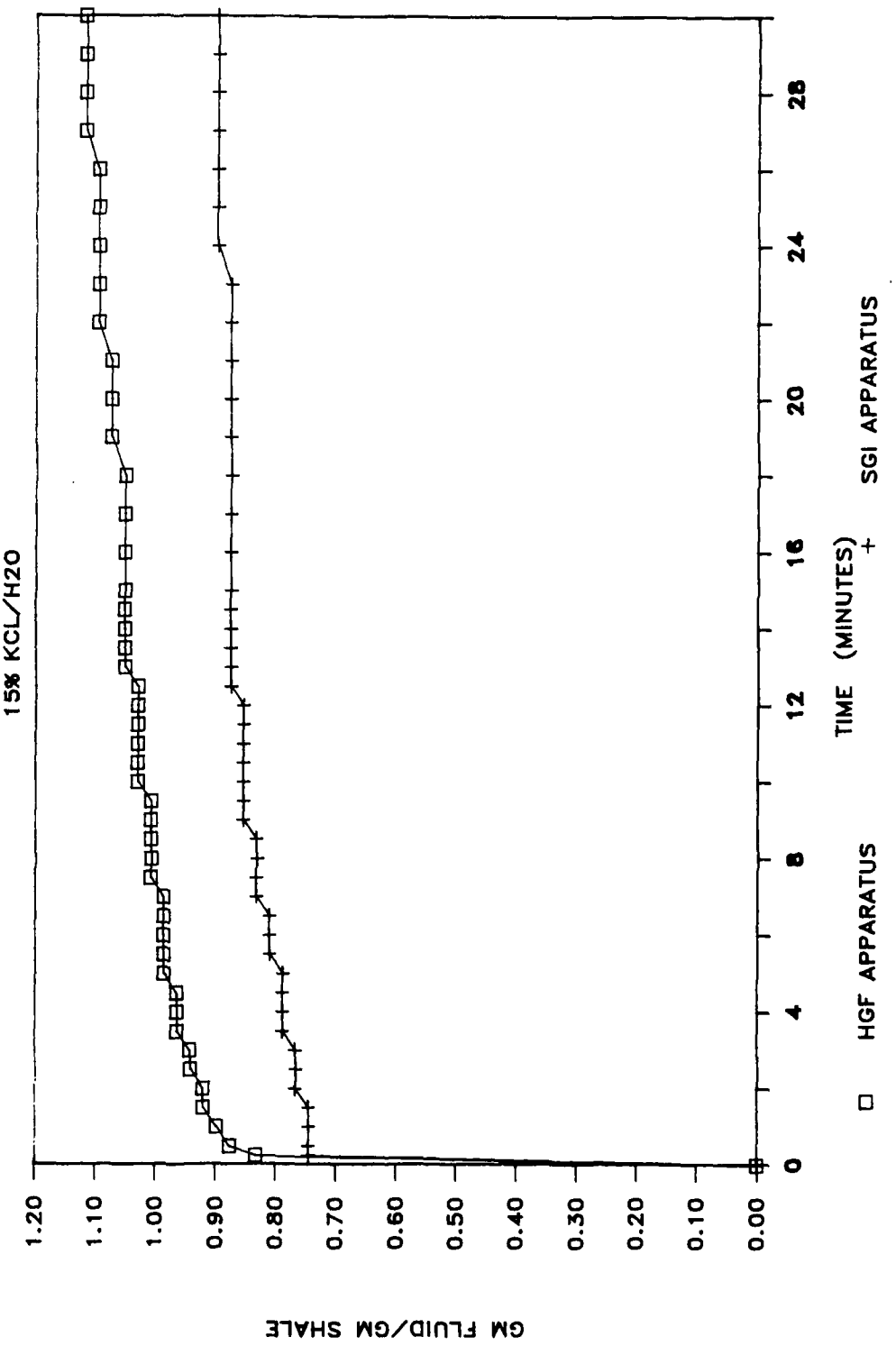


FIGURE 31. ENSILIN TEST-PAC

0% KCL/H2O

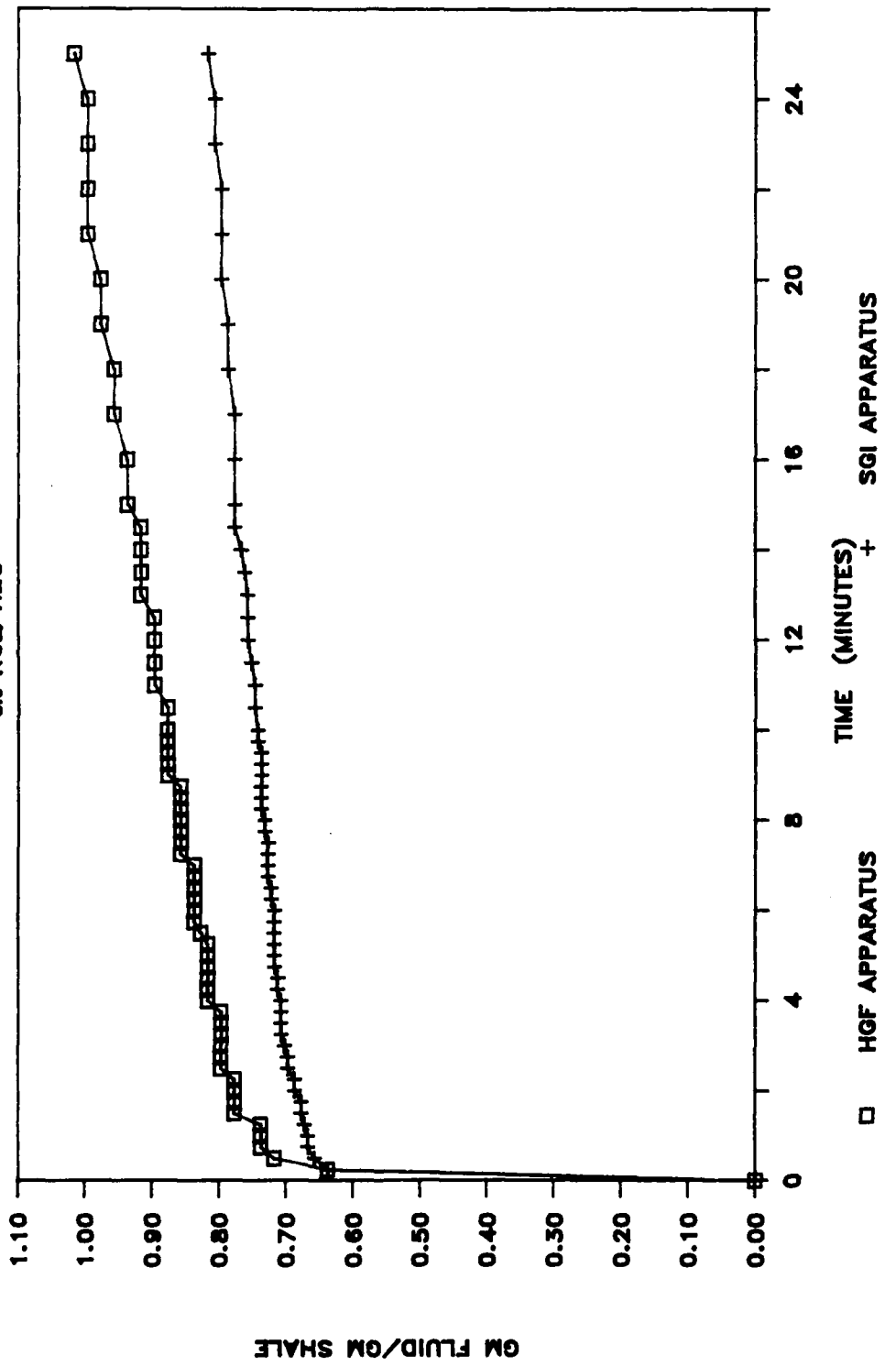


FIGURE 32. ENSILIN TEST-PAC

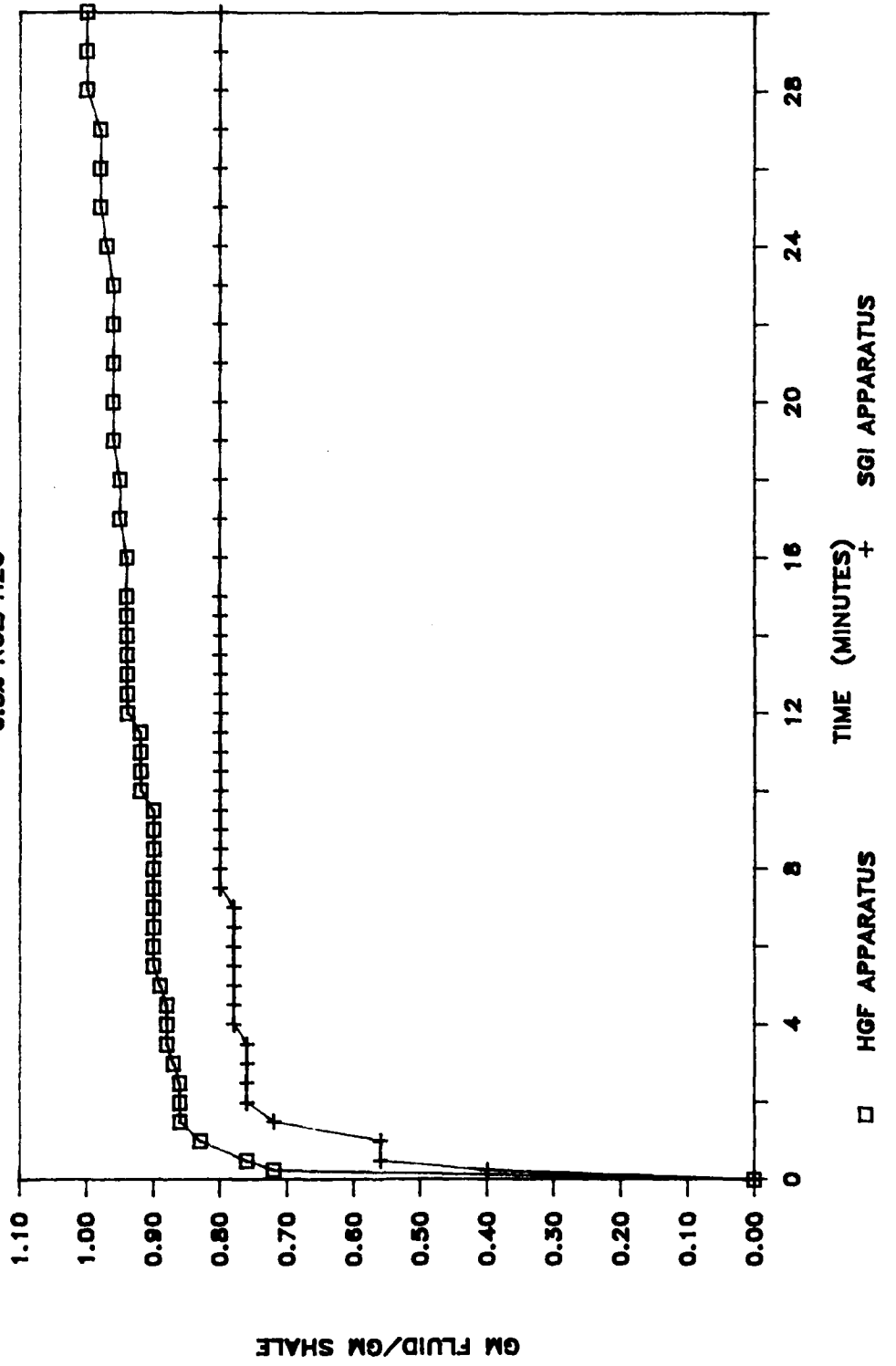


FIGURE 33. ENSILIN TEST-PAC

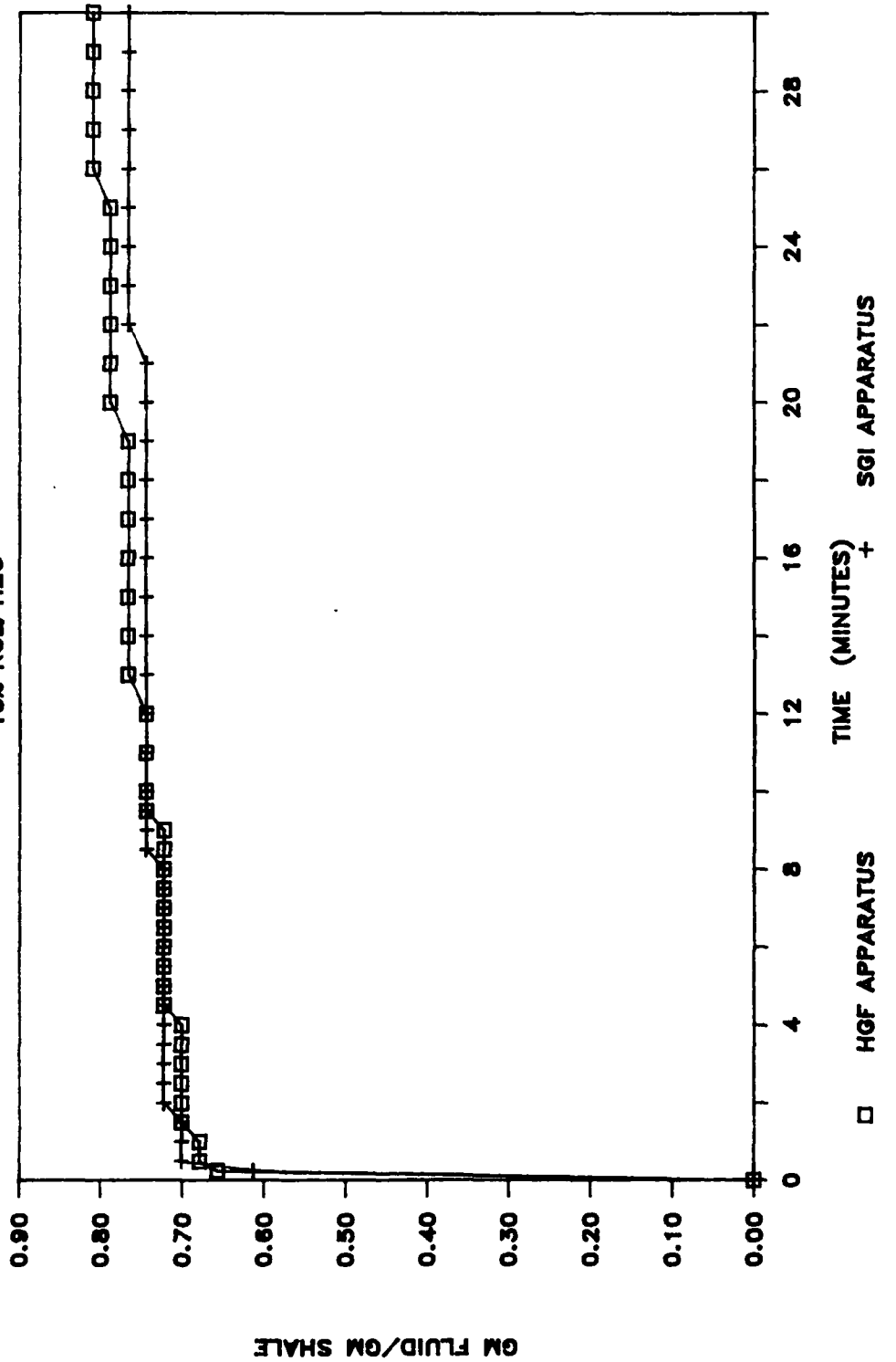


FIGURE 34. ENSILIN TEST-TMC

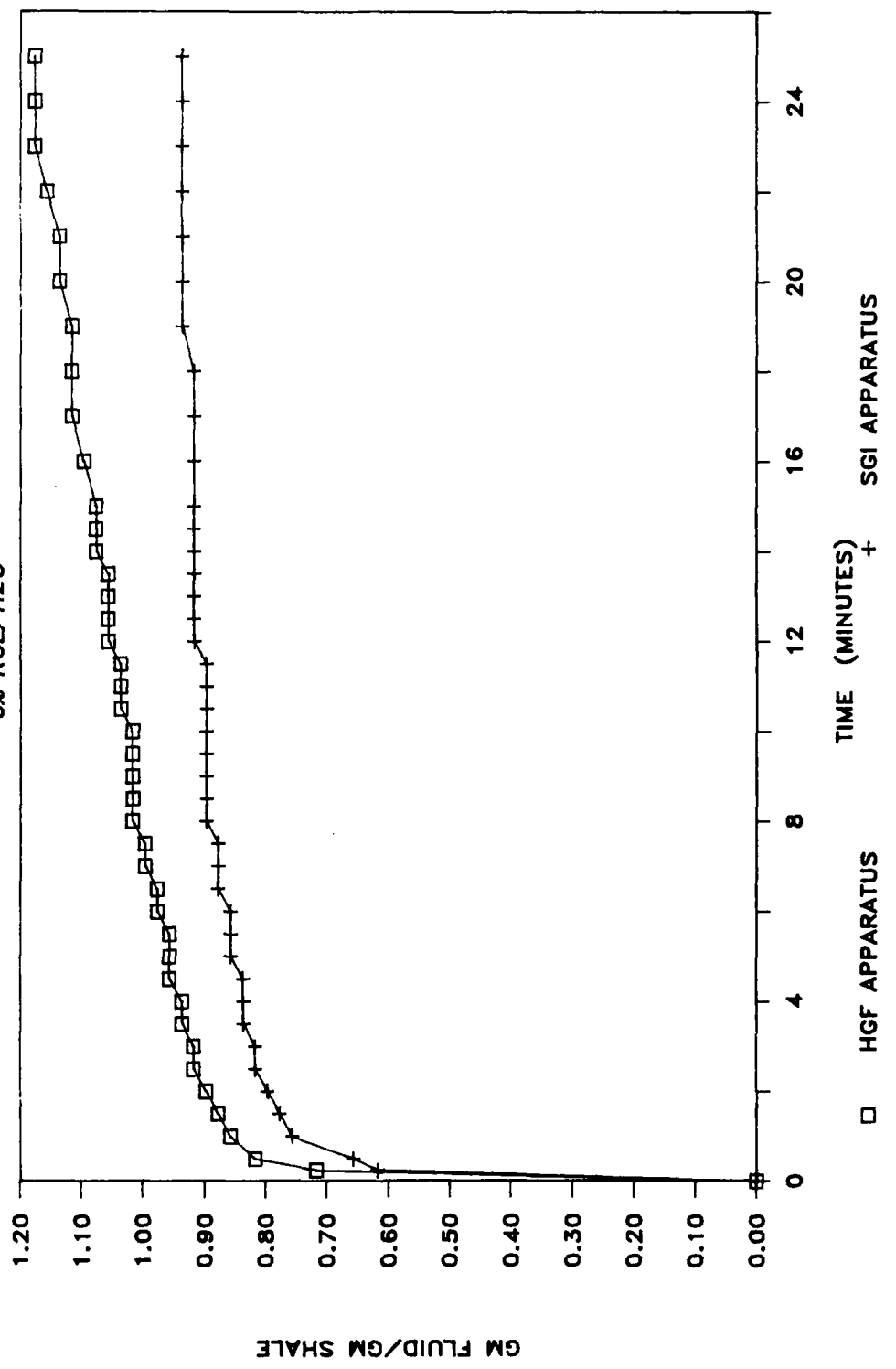


FIGURE 35. ENSILIN TEST-TMC

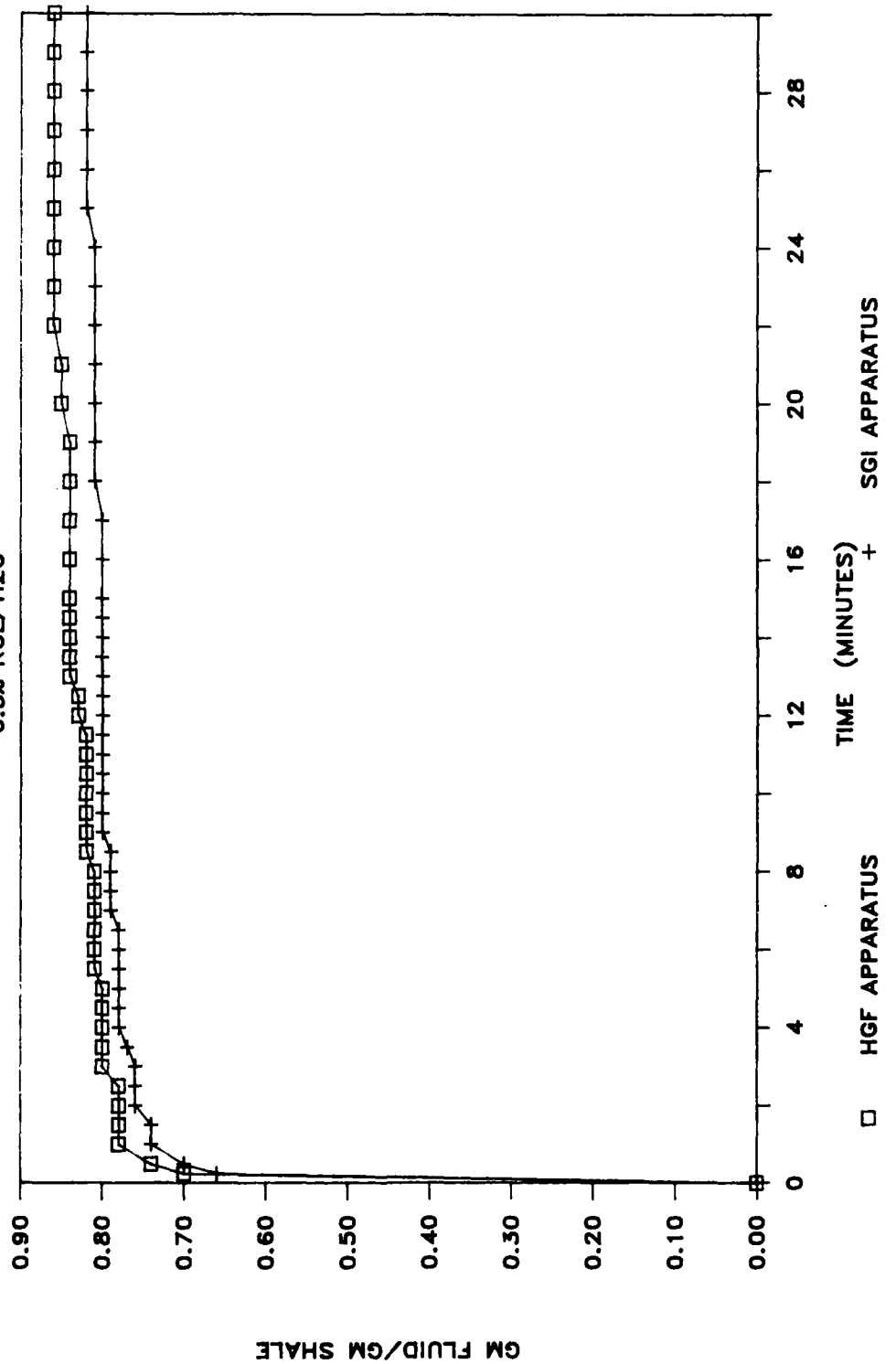


FIGURE 36. ENSILIN TEST-TMC

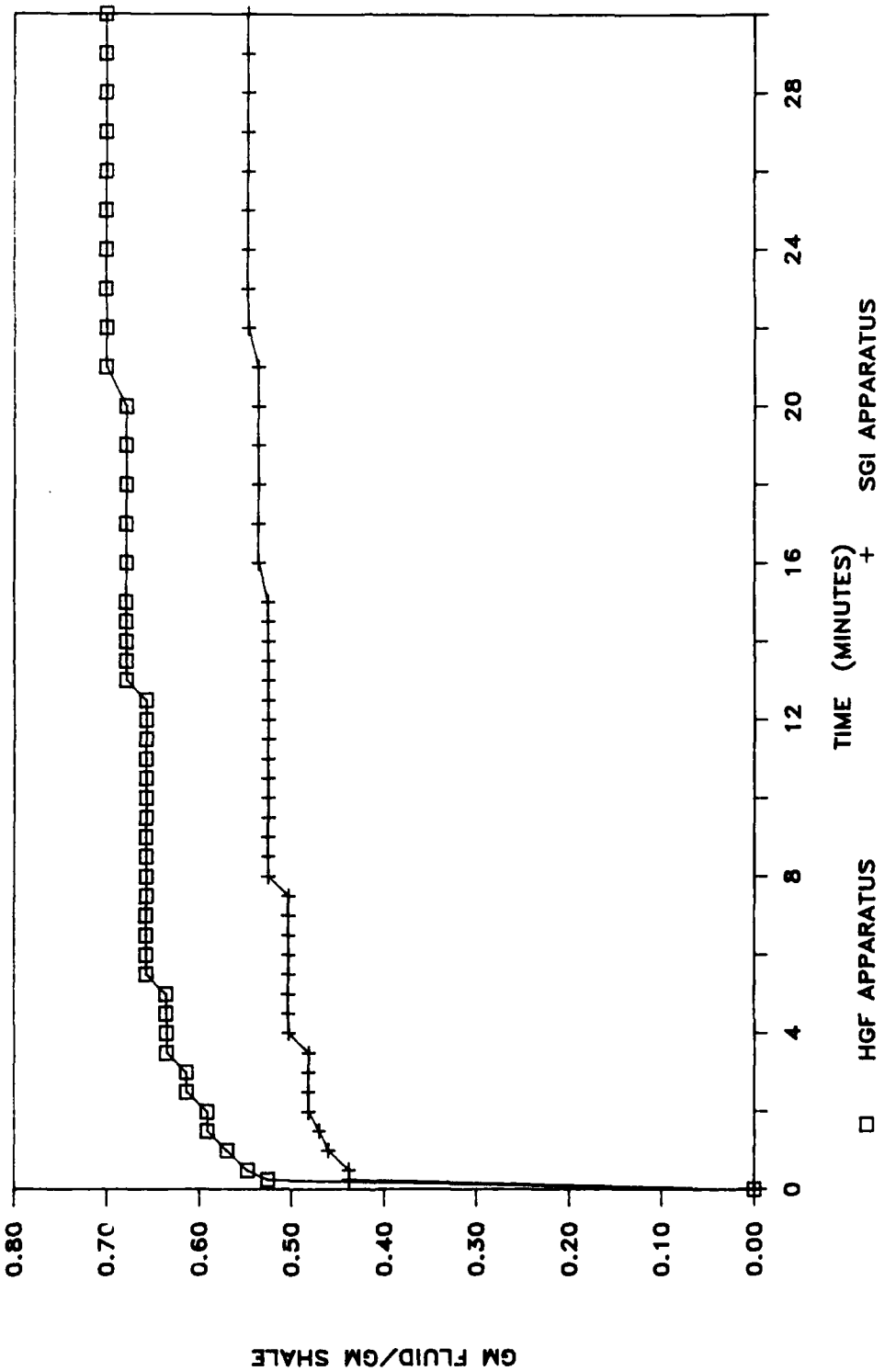


FIGURE 37. ENSILIN TEST-PTX

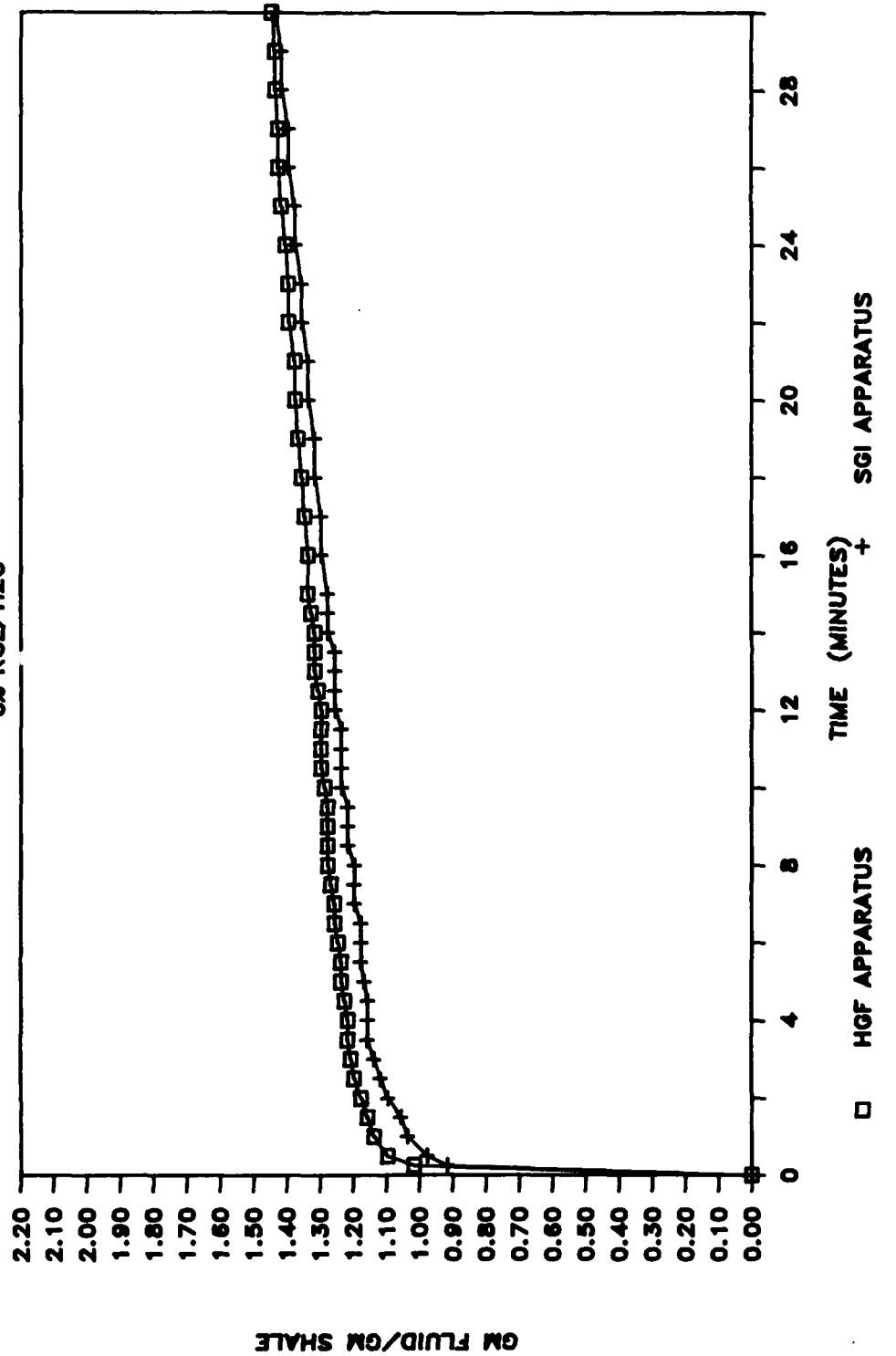
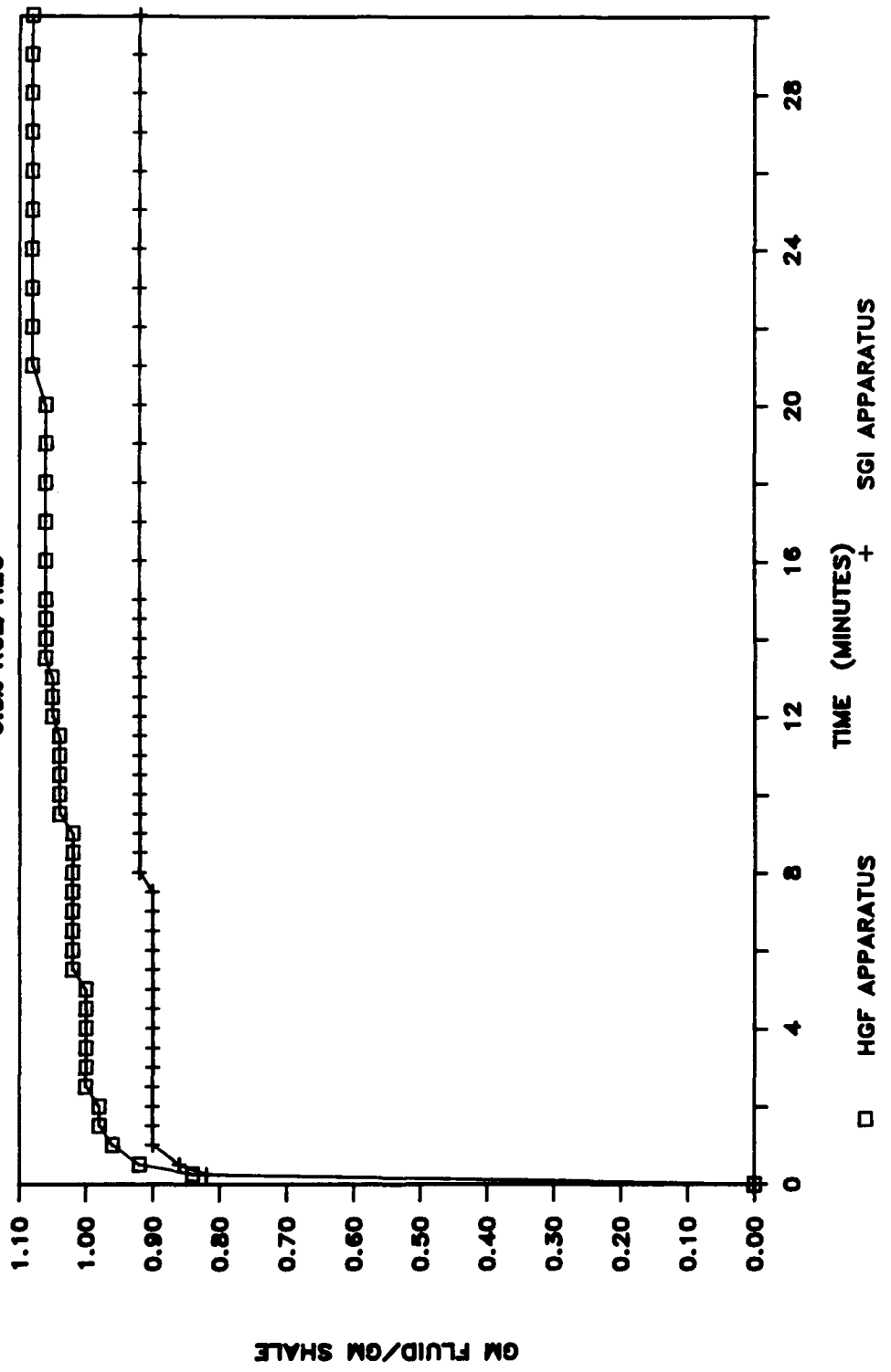


FIGURE 38. ENSILIN TEST-PTX



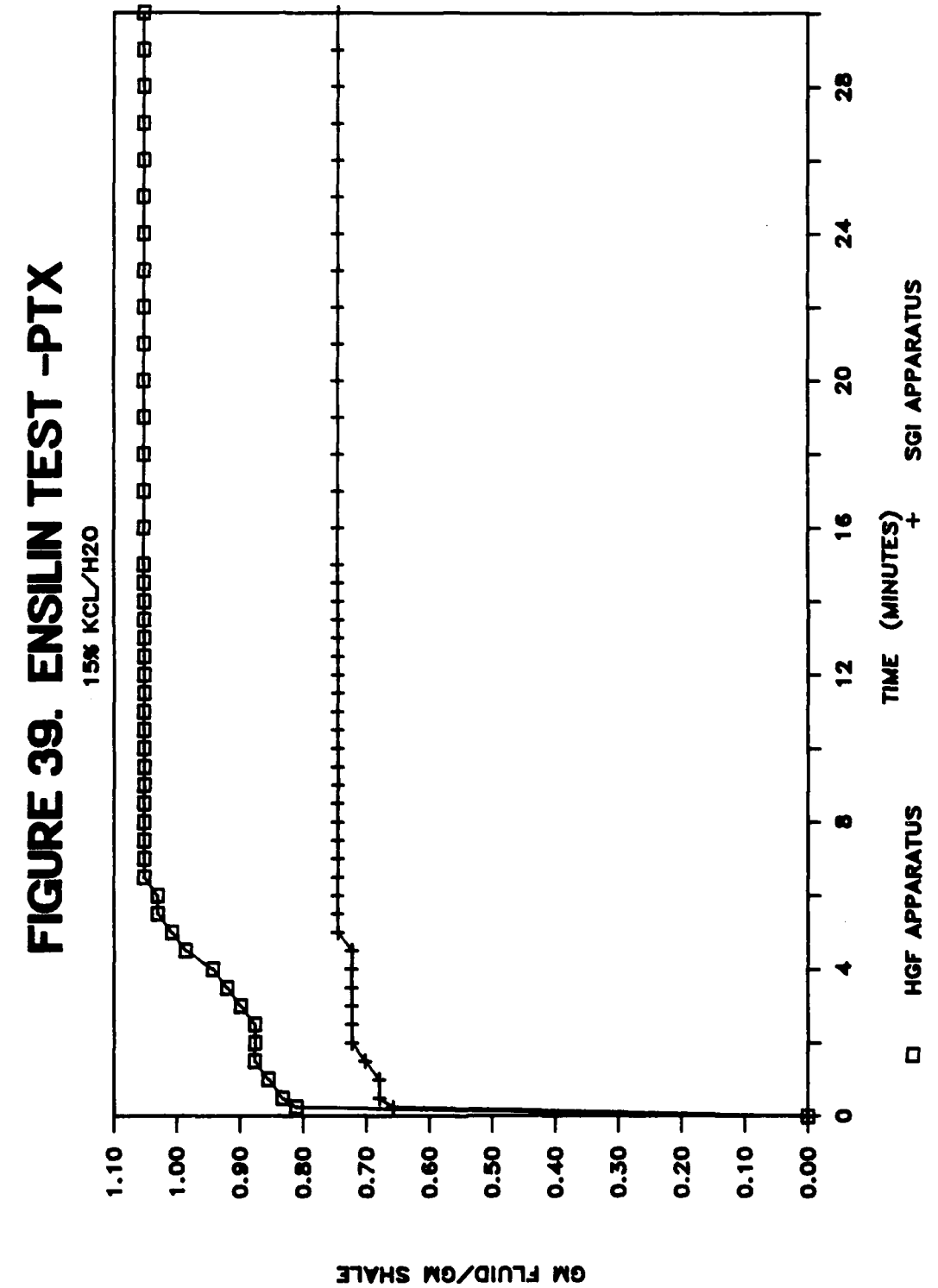


FIGURE 39. ENSILIN TEST -PTX
15% KCL/H2O
GM FLUID/GM SHALE
1.10
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0
4
8
12
16
20
24
28
TIME (MINUTES)
HGF APPARATUS
SGI APPARATUS

FIGURE 40. ENSILIN TEST-PMT

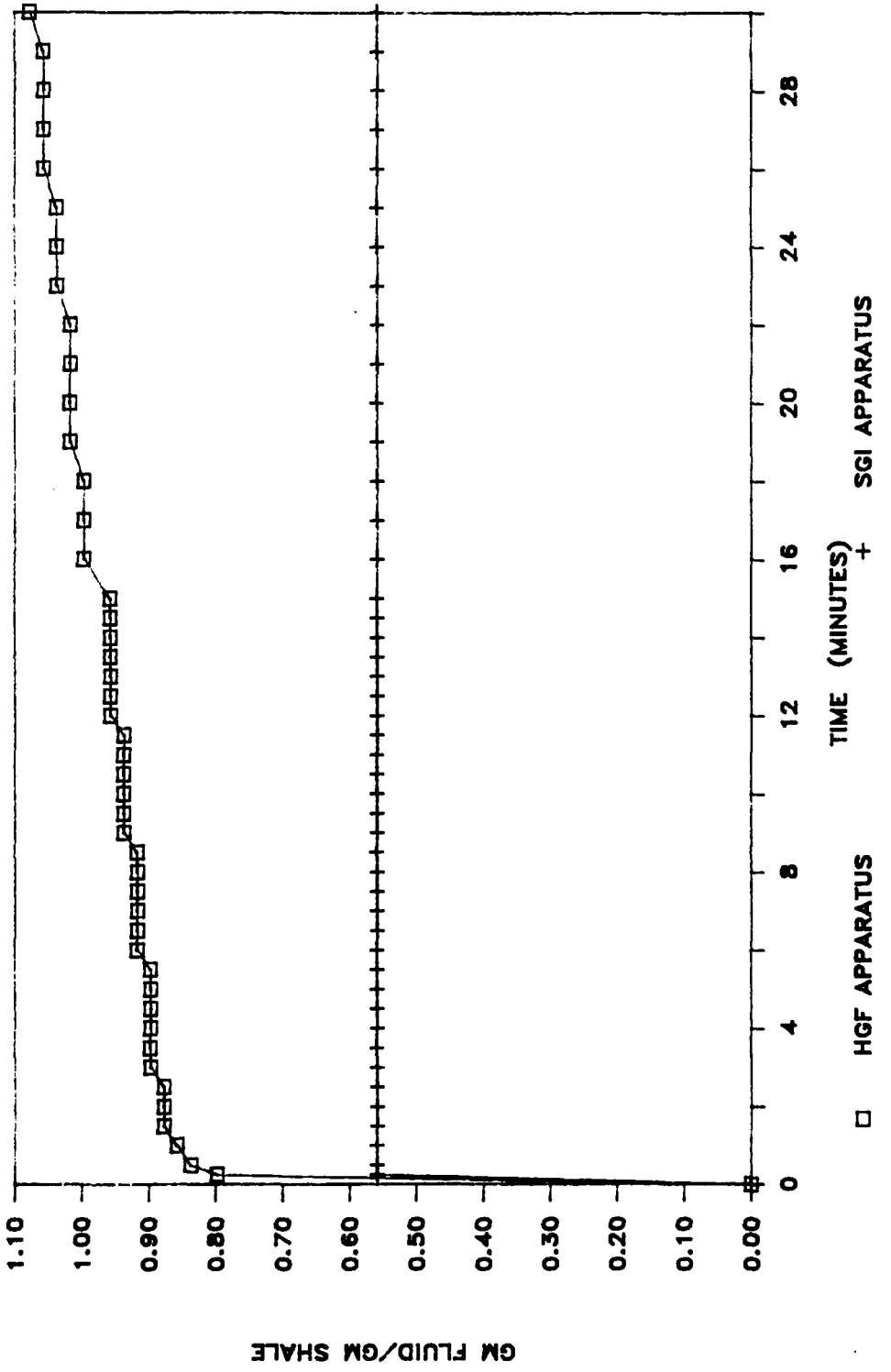


FIGURE 41. ENSILIN TEST-PMT

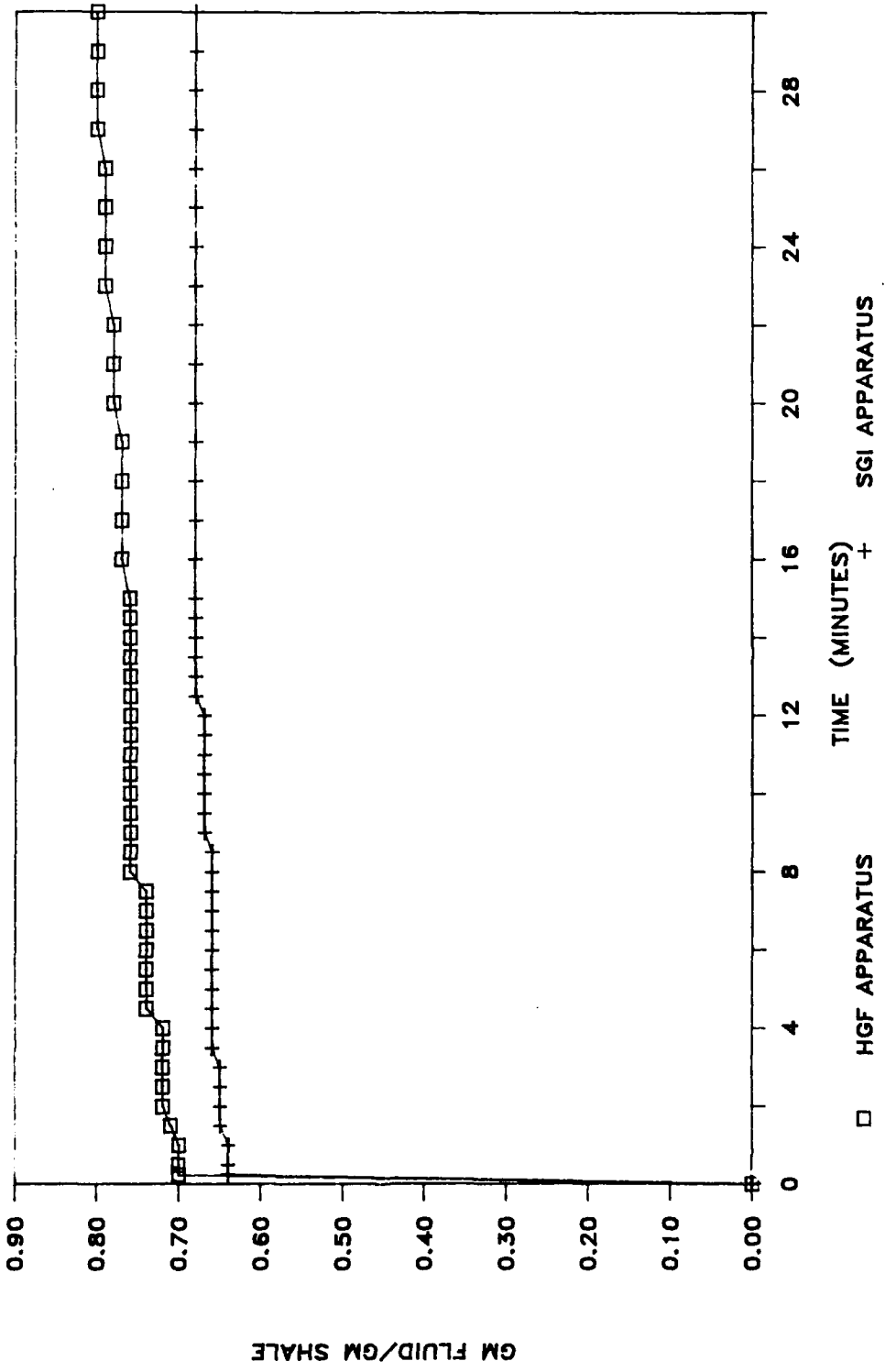


FIGURE 42. ENSILIN TEST-PMT

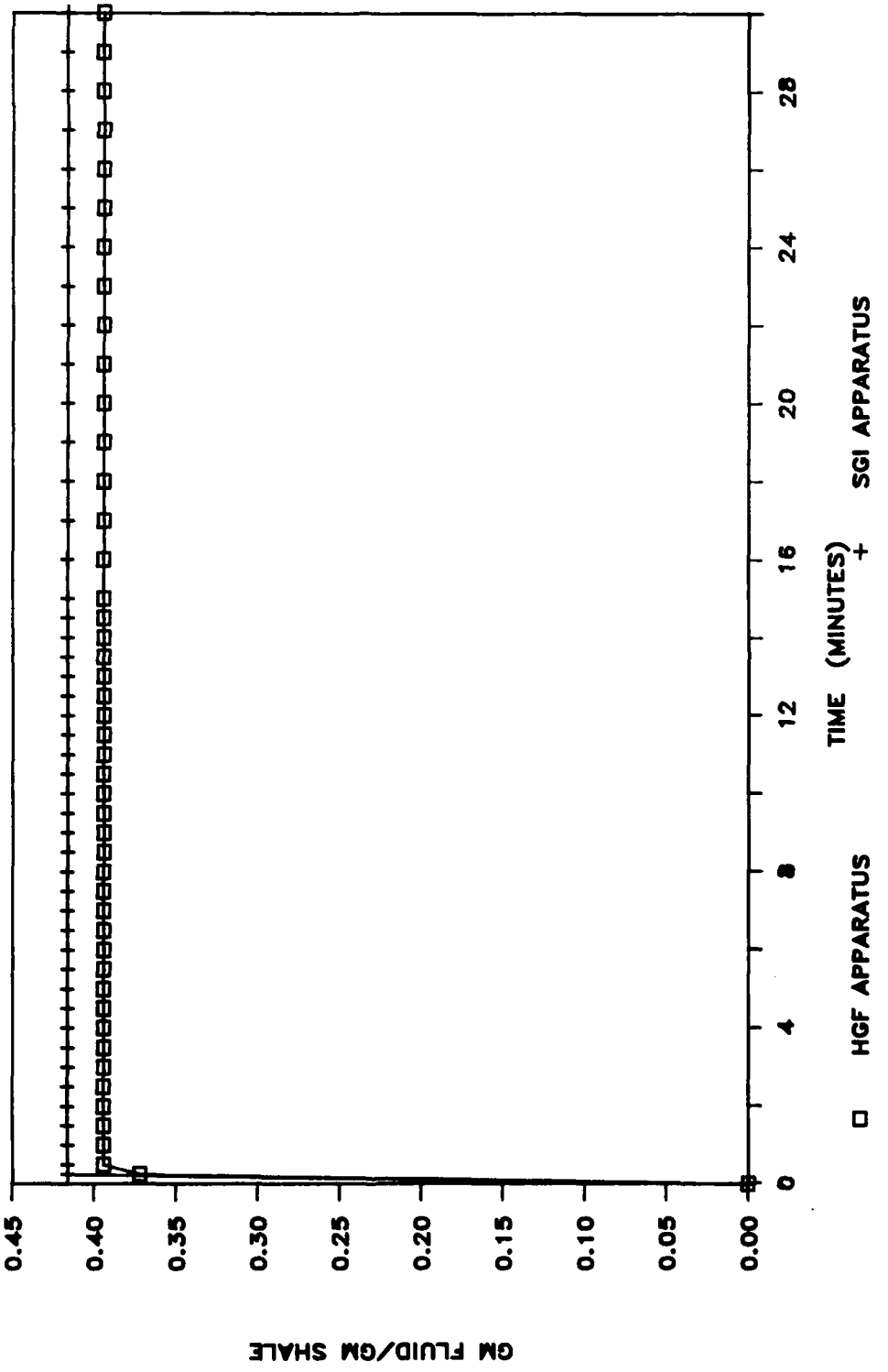


FIGURE 43. ENSILIN TEST-STX

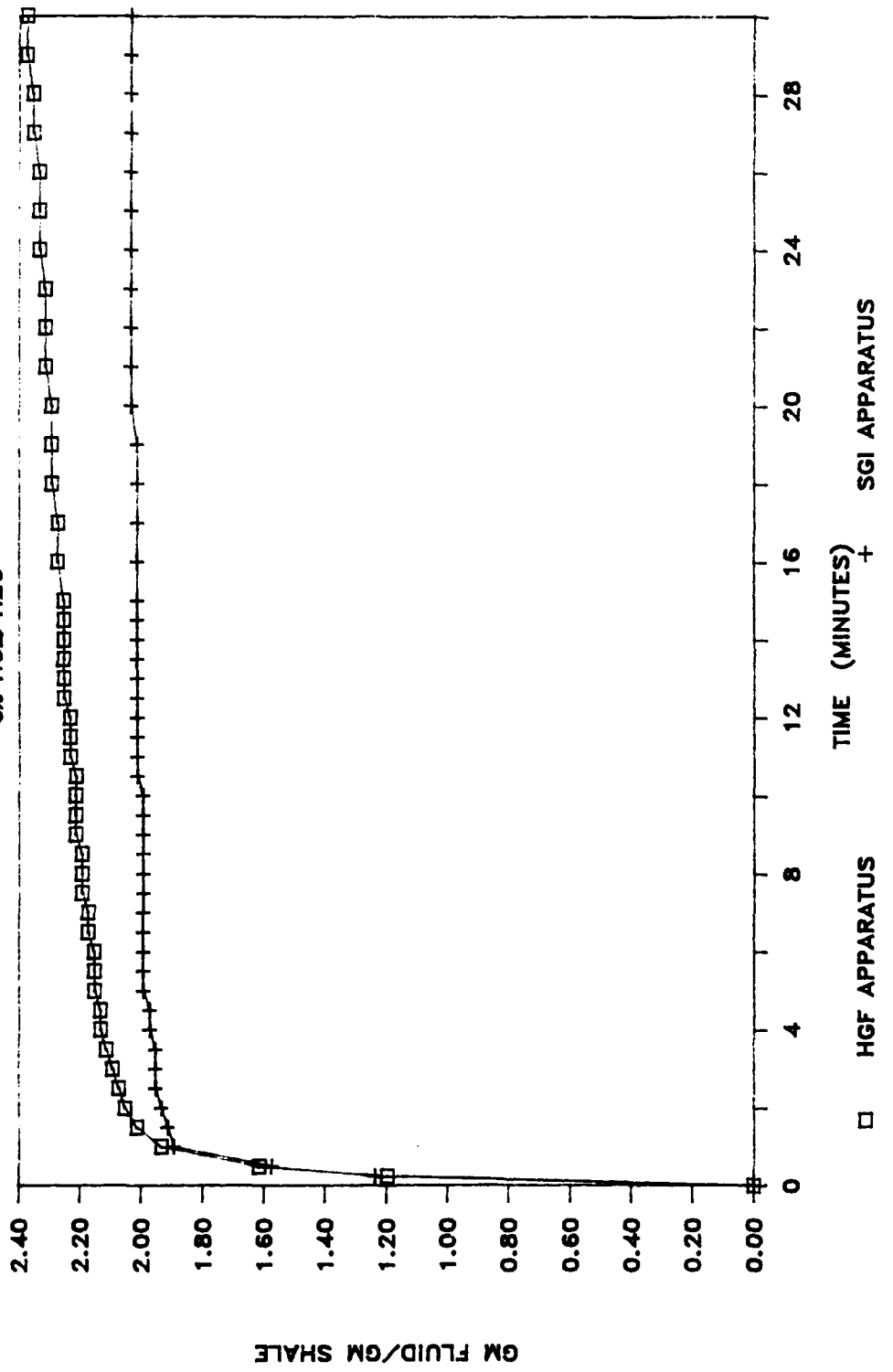


FIGURE 44. ENSILIN TEST-STX

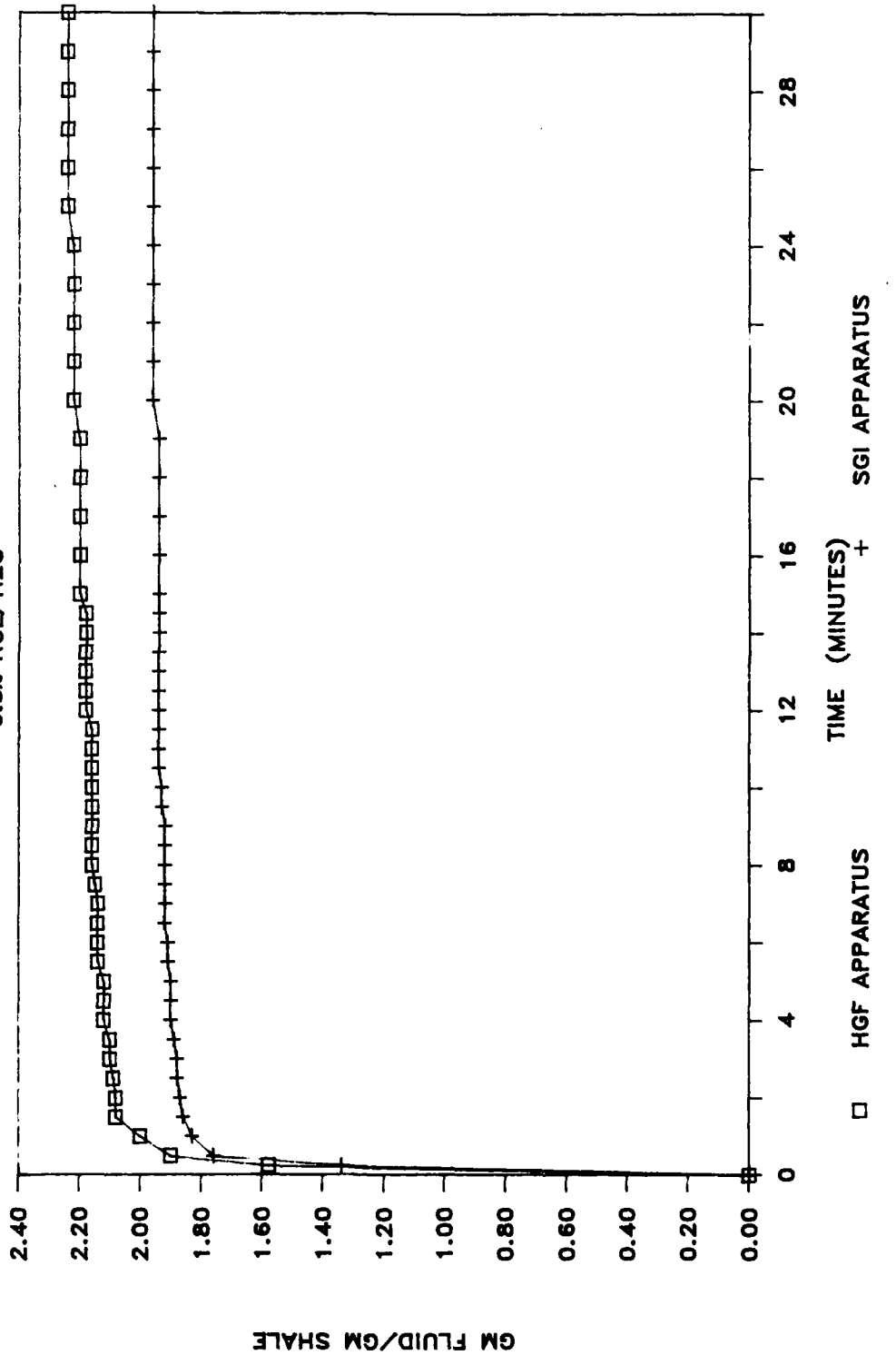


FIGURE 45. ENSILIN TEST-STX

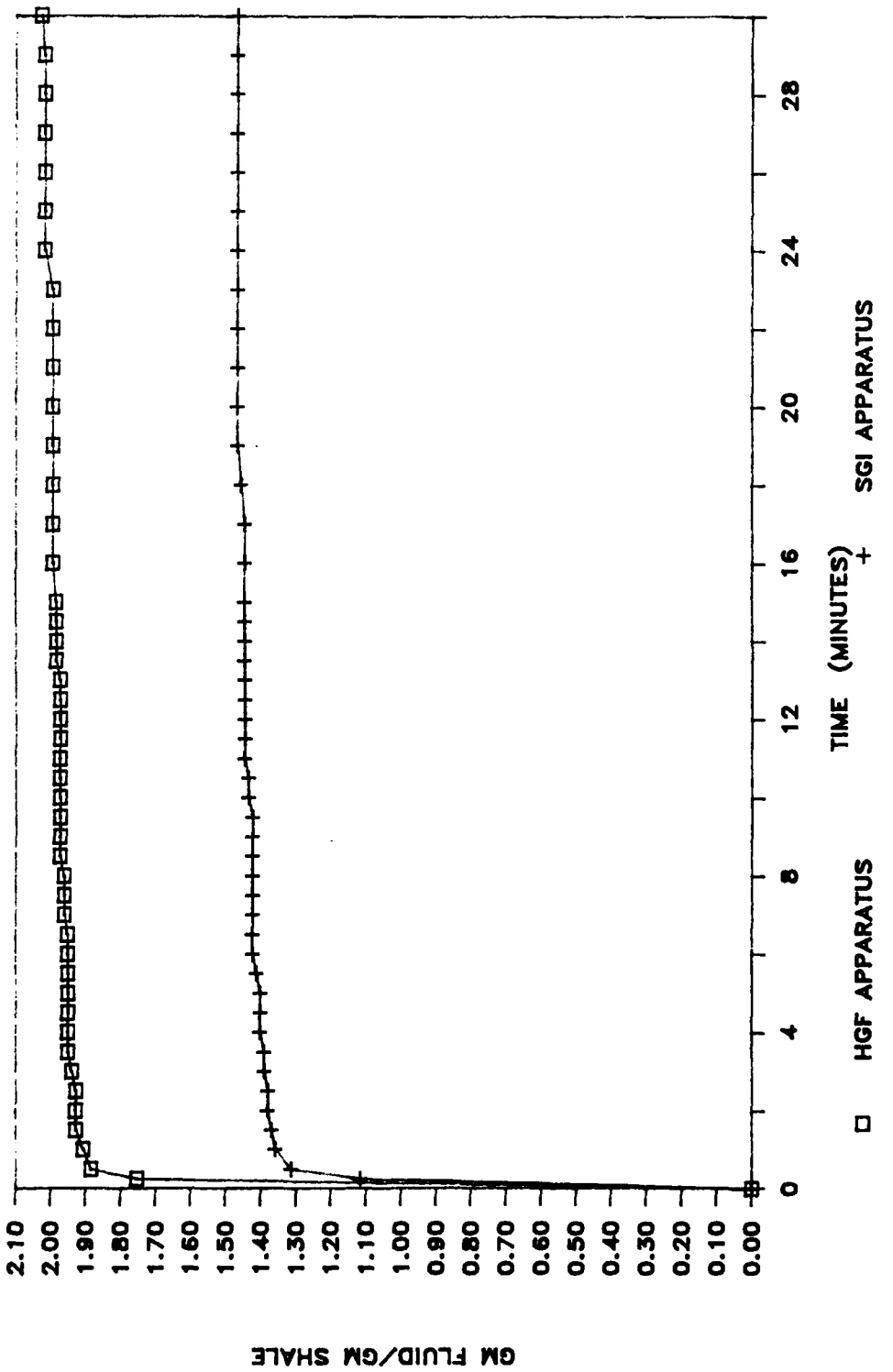


FIGURE 46. ENSILIN TEST-SAZ

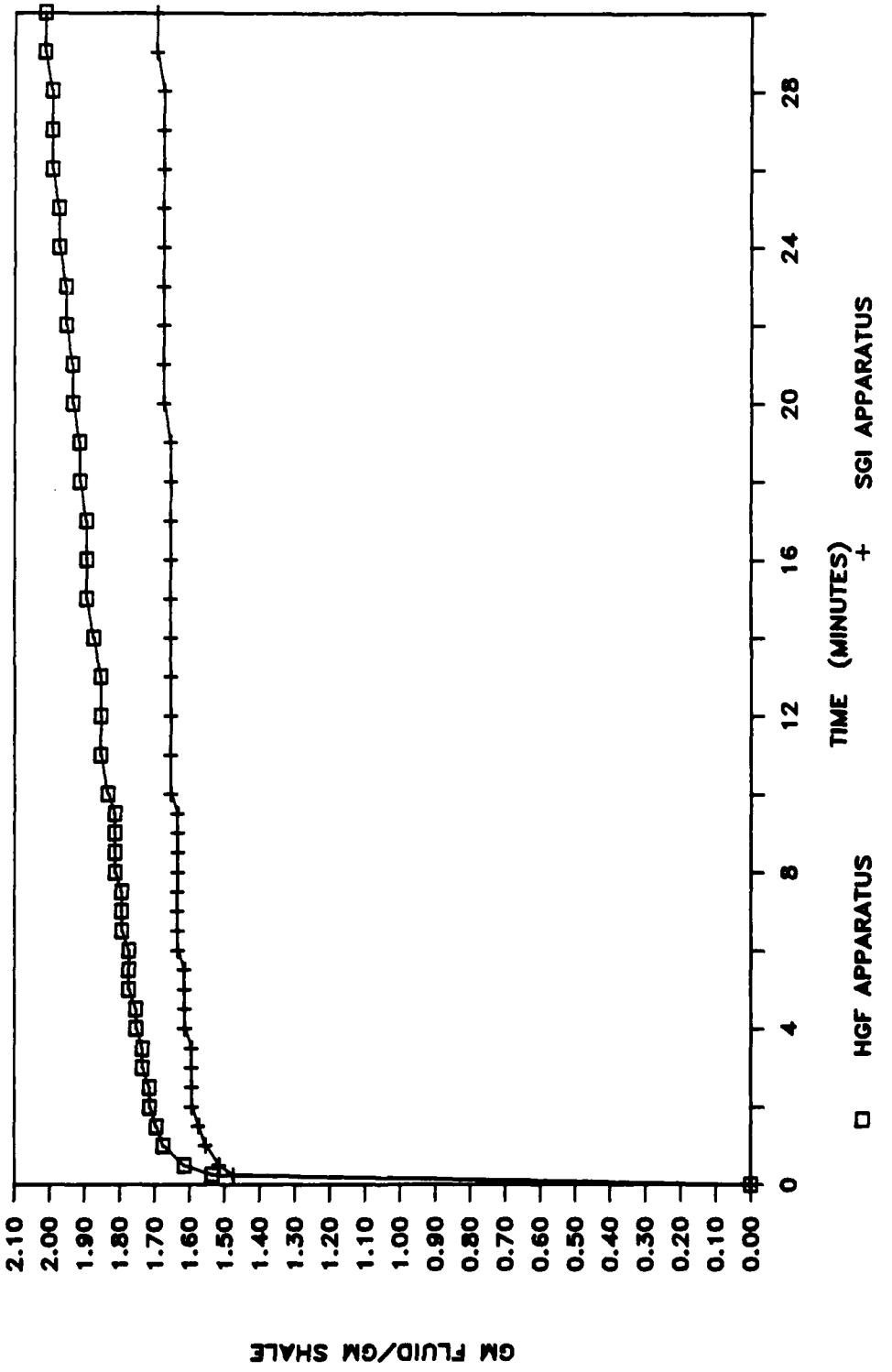


FIGURE 47. ENSILIN TEST-SAZ

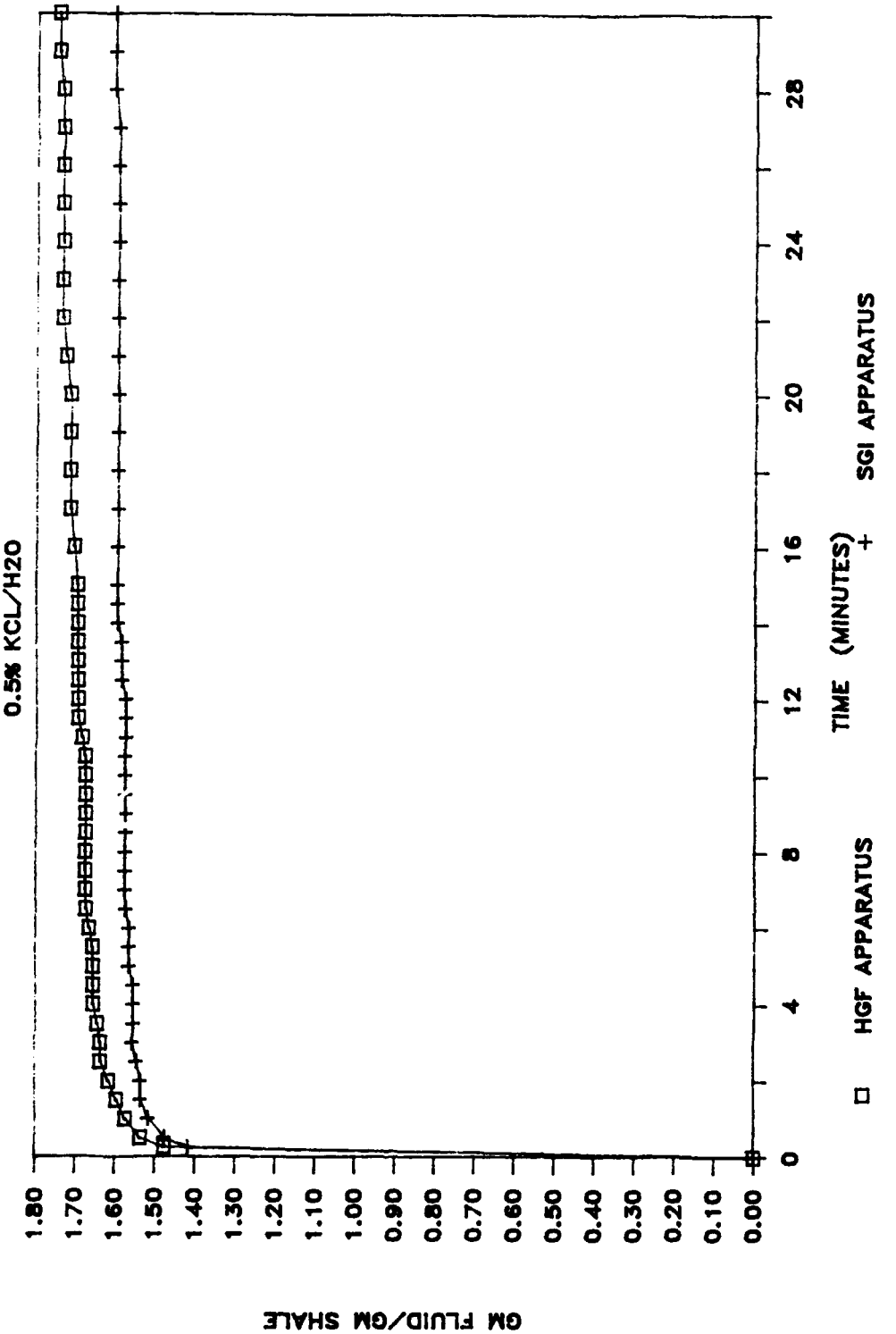


FIGURE 48. ENSILIN TEST-SAZ

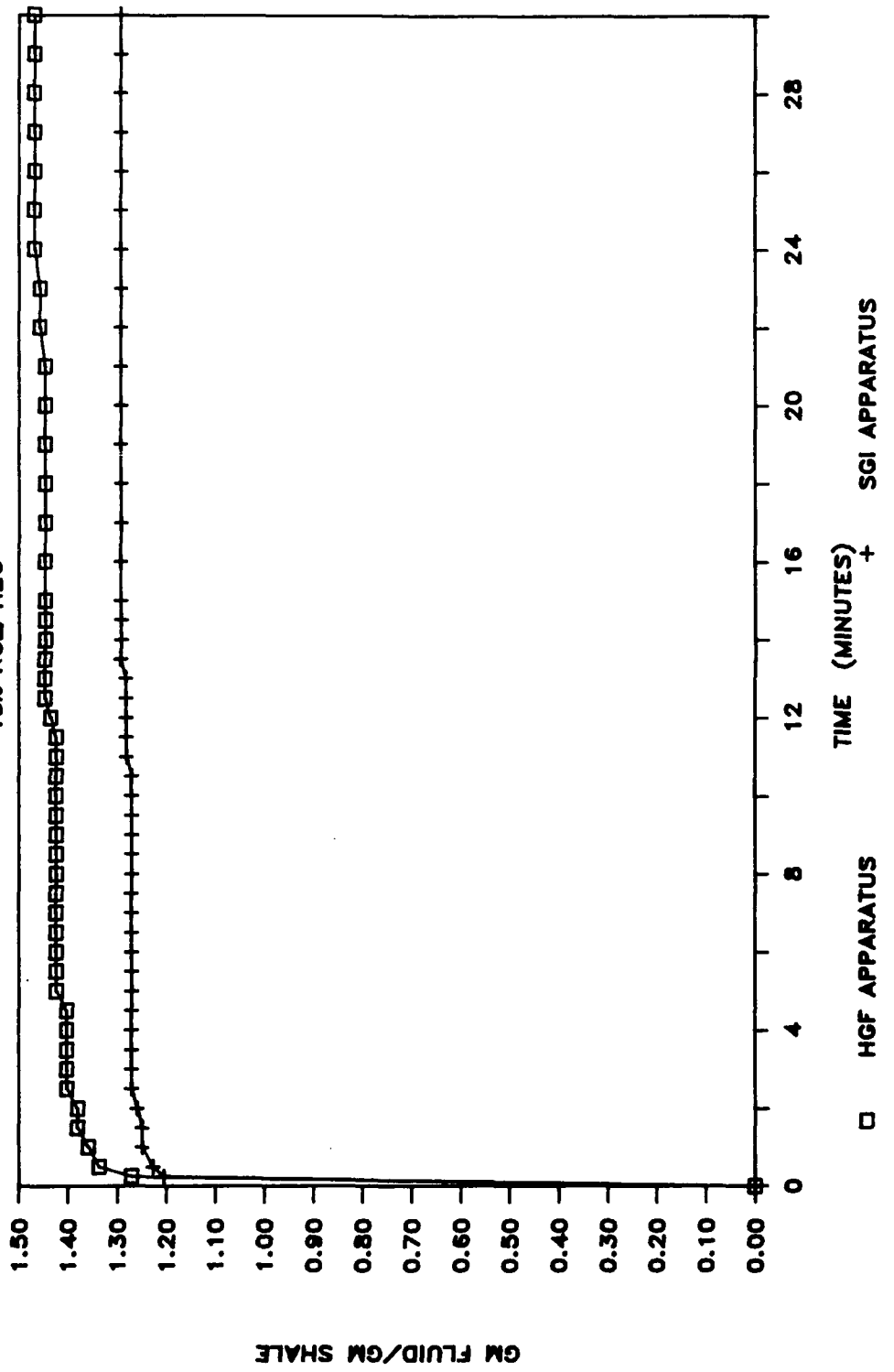


FIGURE 49. ENSILIN TEST-SWY

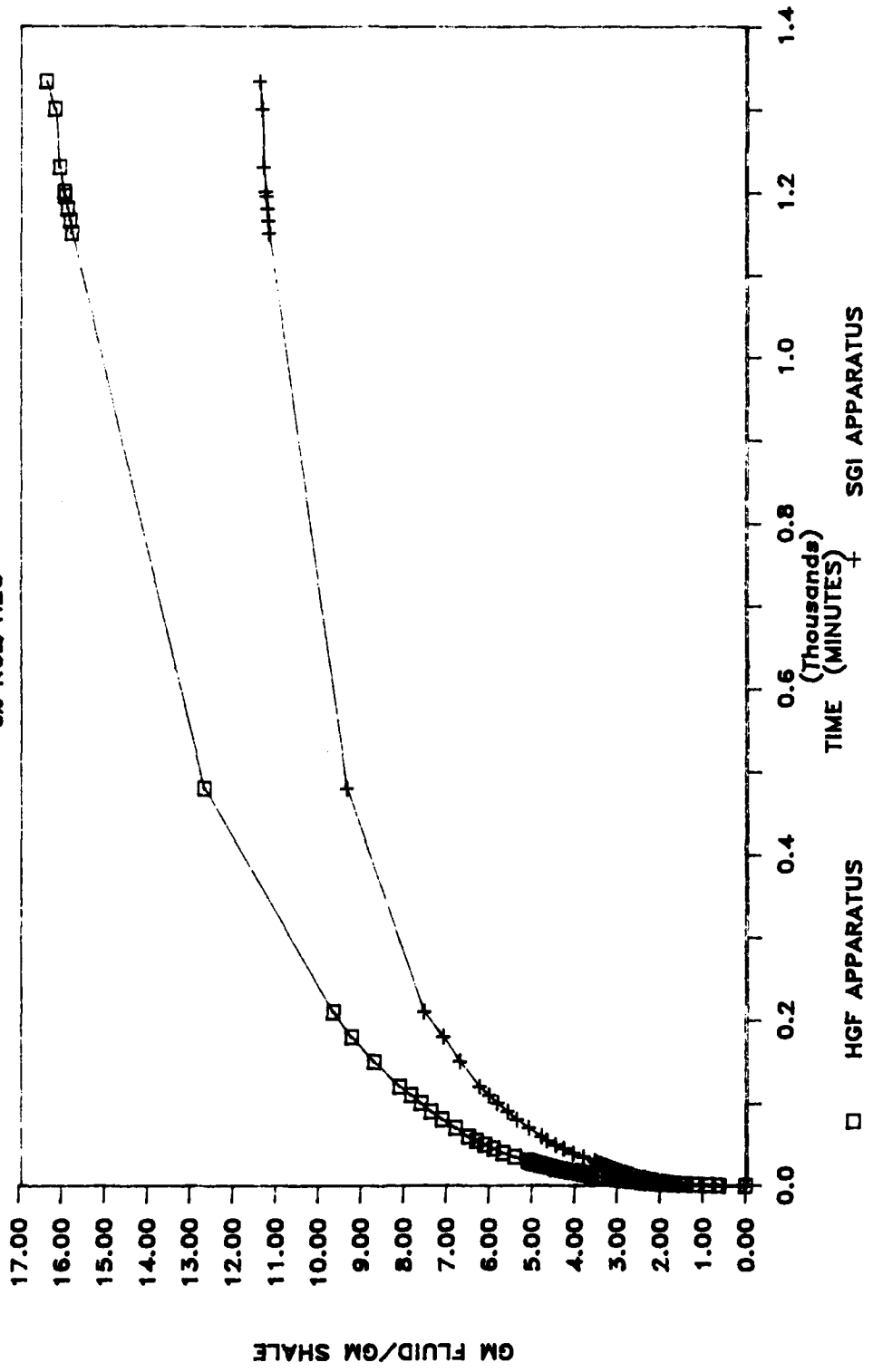


FIGURE 50. ENSILIN TEST-SWY

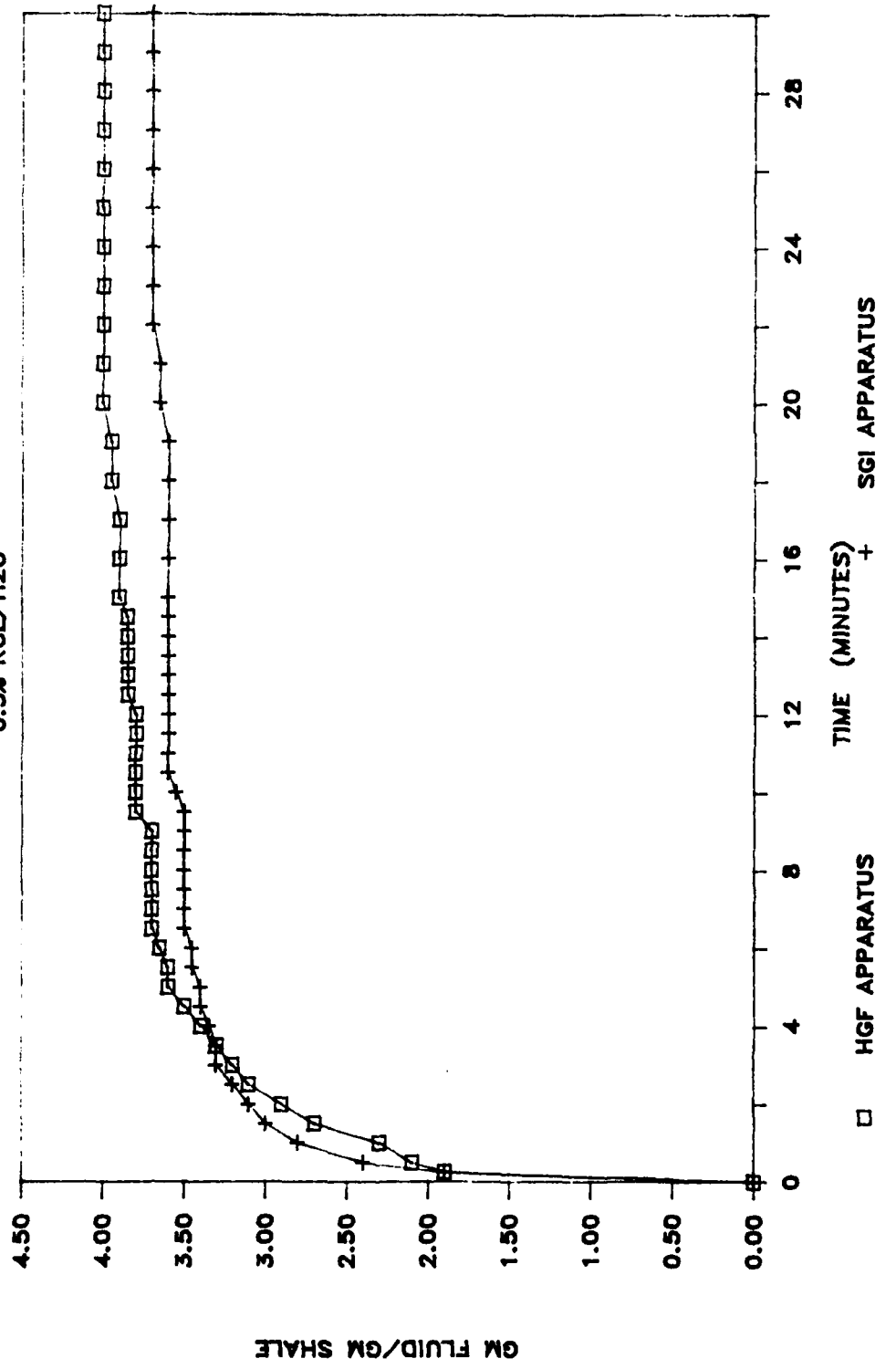
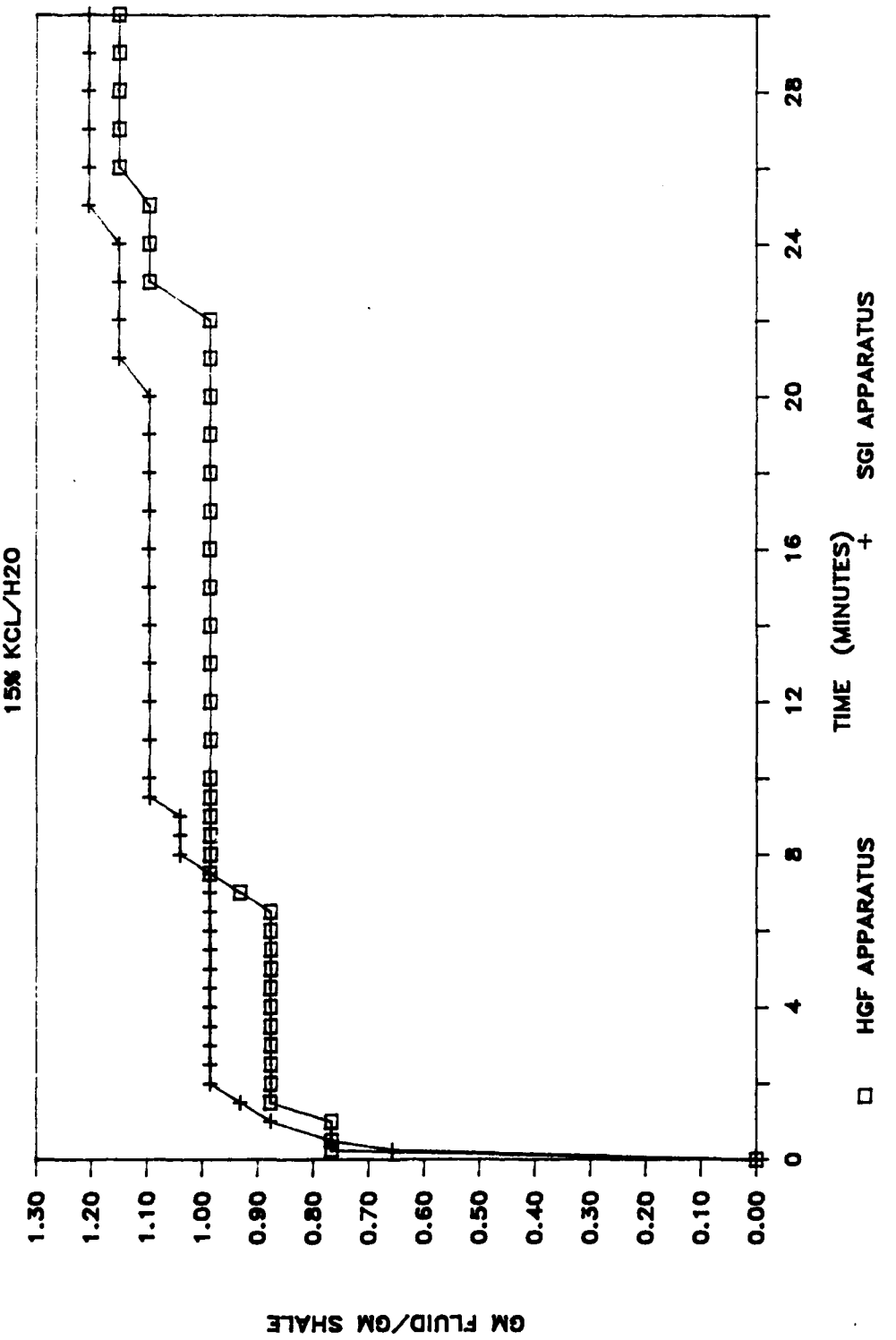


FIGURE 51. ENSILIN TEST-SWY



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This thesis was typed by Thomas C. Redford.